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Arthur Newhall Esq C.B. M.D F.R.C.P.
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with kind regards from his aged friend

Laurel Brunt

Nov. 15. 1915

(see pamphlet 17 p. 17)

COLLECTED PAPERS
ON
PHYSICAL AND MILITARY
TRAINING

BY

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PREFACE.

In the summer of 1869 I went to work with Professor Ludwig in his new Physiological Institute in Leipzig, which was then just open but not quite completed. There were three departments in it, experimental, chemical and histological. Several men were working in the histological department under Professor Schweigger-Seidel, but the only man besides myself working in the experimental department was W. Sadler, a Russian, who was engaged according to Ludwig's plan in a research upon the flow of blood through muscle during contraction and relaxation. I was a constant witness of these experiments and naturally became interested in the question of muscular nutrition.

My attention was first directed to physical training by my friend, Professor Angelo Mosso, of Turin, when he stayed with me on a visit he made to this country at the request of Queen Margherita to investigate physical training in girls' schools, and the conditions of fatigue in trades requiring great physical exertion, such as iron puddlers. While thinking over physical training my thoughts were naturally led to military training and the needs of the country. In 1899, I wrote a letter to *The Times* on this subject, but it went into the editor's waste paper basket. In 1901, I discussed with a patient of mine, Col. Pennington, the subject of military training, and we drew out together a draft plan of a scheme for such training in schools. Early in 1902 I asked a few men, whom I thought likely to be interested in the subject, to dine with me at the Reform Club. There were Mr. (now Lord) Haldane, Mr. Buckle, Editor of *The Times*, Sir Henry Craik, representing Education, Sir Henry Conyghame, of the Home Office, and myself. The late Lord Frankfort had accepted, as representing the Army, but his illness (shortly afterwards fatal) prevented him from coming, and his place was taken by Colonel Stopford. At

this dinner the whole subject was discussed, and it was decided that in the present temper of the country any attempt to try and get military training in schools was quite hopeless, and it was decided that the only possible thing was to try for physical training. Shortly after this I was laid up for many months with blood poisoning, and it was only during my recovery, nearly a year afterwards, that I could take up the subject again. In a letter to *The Lancet*, in February, 1903, I proposed the appointment of a commission to investigate the subject of physical degeneration, and again in a letter to *The Manchester Guardian* of April 2nd, 1903. Had the risks which I then pointed out been recognised, and the course I then advocated been adopted, our position in regard to this present war would have been very different. A month or so after this, Sir William Taylor and Sir Frederick Maurice were dining with my friend and colleague, the late Howard Marsh, whose son was married to Sir Frederick Maurice's daughter. They discussed the question of physical efficiency, which had been first raised by Sir Frederick Maurice in a paper in *The Fortnightly Review* under the signature of Miles. In consequence of this, Sir William Taylor addressed a memorandum to the War Office and an Inter-departmental Committee was appointed to investigate into the causes of physical degeneration. It was evident that, although this committee might present an admirable report, this would only be advisory, and some agency would be required to carry out its recommendations. Accordingly, before the committee was actually appointed, I wrote letters to *The Lancet* and *British Medical Journal* pointing out the necessity for some society to carry out the necessary reforms which might possibly be advised by the Commission. In order to secure this I asked a number of men likely to be interested in the subject to dine with me at the Athenæum Club, and laid before them a draft scheme for a National League. Those who came, although they approved of the scheme, were busy men, and I was left to work single-handed, or with the aid of a secretary whom I paid out of my own pocket. Gradually, however, a nucleus was established of men who were willing to take part in the League as soon as it should be formed, and it was formally inaugurated at the Mansion House on June 28th, 1905. Since

that time it has been steadily at work and extending its activities, not only to physical training, but to health subjects generally, and especially to the prevention of infant mortality. This subject, by the influence and energy of Mr. Alderman Broadbent, has become developed to a very great extent.

The National League owes a deep debt of gratitude to Bishop Boyd Carpenter, who has presided over the meetings of the Committee, with such gentleness and firmness that he has caused the members to work harmoniously together and has greatly increased the usefulness of the League.

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- 17 Report of the Inter-departmental Committee on Physical Degeneration (*Public Health*, February, 1905).

- 18 Progress of Proposed National League for Physical Education and Improvement.
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- 28 Address at Sheffield on the National League for Physical Education and Improvement. (October 22nd, 1906).
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EXERCISE AND OVER-EXERCISE.*

By LAUDER BRUNTON, M.D., F.R.S.

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THERE is generally a great deal of truth in old proverbs because they represent the essence of much observation which has been condensed together and cleared of all unnecessary surroundings. The proverb that "it is better to wear out than to rust out" is no exception to the rule, and an article in constant use is very likely to stand longer than one totally disused and exposed to rust, to say nothing of the advantages obtained by using it instead of allowing it to lie idle. But over-use will wear out things before their time, and every mother knows that a boy's clothes do not last anything like so long when the boy is wearing them as if they were put up with camphor in a wardrobe. Use is good but over-use is bad, and what is true of implements and clothes is true also of the human body. Exercise of all the various parts tends to keep them in regular working order and prevents them from undergoing premature decay, but over-exertion, on the other hand, tends to break them down before their time. Now we may have exertion of all the different parts of the body—of the brain, of the limbs, of the digestive organs—and although it is necessary for the perfect life of man that these all should work, they cannot all work at their full power at the same time. The most accomplished author or the greatest mathematician would not choose the hour immediately after a heavy dinner to write a book or solve a problem, and a man I knew used to sit down in an easy chair every Sunday afternoon, and announce to his family that he was going to meditate on the sermon he had heard shortly before, but in a very short time the result of his meditations was announced by a series of loud snores. Most of you have

* The Inaugural Address, York Medical Society, October 12, 1898. Reprinted from the *Medical Chronicle*.

heard of Mark Twain's horse, which looked as though it wanted to lean up against a post to think, and I daresay many of you

FIG. 1.

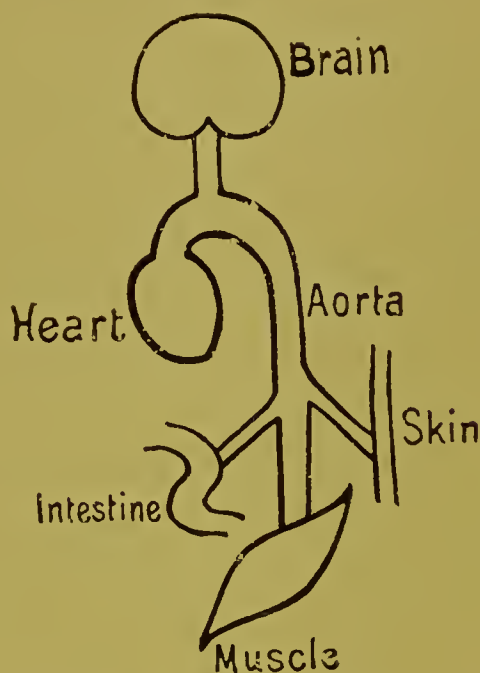
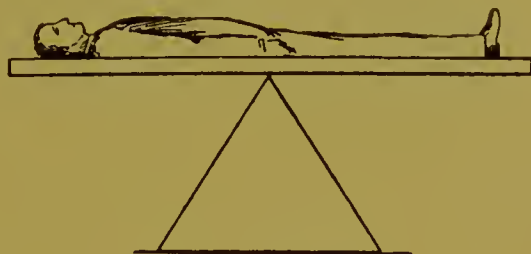


Diagram showing the four great areas for the distribution of blood in the body, viz., the muscles, the brain, the intestine and the skin.

have noticed that when people are asked a question while walking, they not infrequently stop to think. We see, then, that digestion and bodily exercise are both to a certain extent incompatible with severe mental exertion. Bodily exercise and digestion are also to a great extent incompatible with one another, and people who begin to do active work immediately after a full meal are apt to suffer from indigestion. This is so generally recognised that if we go about midday through the street of a town which is being repaved, or through a harvest field which is being reaped, we find the workmen and reapers take a much longer break than is necessary merely to consume their food, and they rest for a long while afterwards, so as to allow time for digestion. One of the chief reasons why the brain, legs and arms, and the digestive organs cannot all work at the same time is that they all not only require blood to do

their work, but the more work they do the more blood they need, while there is not enough blood in the body to supply all of them fully at the same time. In some towns where the water supply is rather short we find turncocks who go about turning the water supply on to one district while they turn it off from another; and in the body we have a set of nerves—the vaso-motor nerves—which have a similar duty, and turn off the

FIG. 2.

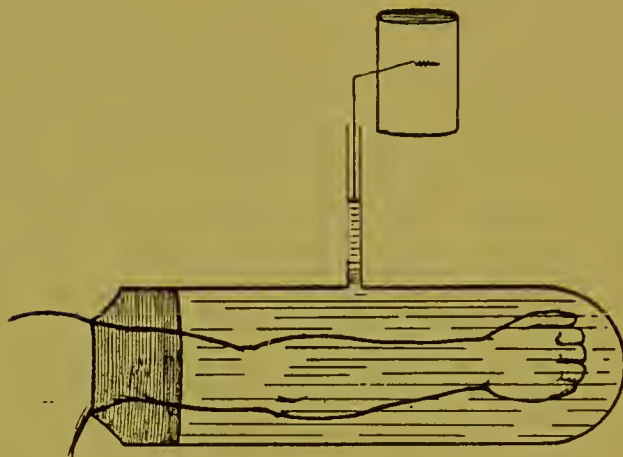


Mosso's Table Balance.

supply of blood from one part while they turn it on to another. Thus after dinner they turn the blood on to the digestive canal, and turn it off from the legs, arms, and brain. When a man stops to think they turn it on to his brain and off from his legs and arms. This has been shown in a very neat way indeed by my friend Professor A. Mosso, of Turin, who had a long table so delicately balanced on its axis that it would turn one way or another with a very slight weight. Upon this he laid a man so that his head and legs were equally balanced, and the table remained exactly level. On telling the man to think vigorously, the blood left his legs and went to his head, with the result that the head went down and the legs went up. He showed the same thing in another way; he put the arm into a vessel full of water and connected this with an index (Fig. 3). As soon as the man who was being experimented upon began to do a mental calculation, the blood left the arm to go to the brain, and so the index fell (Fig. 4).

But it is not only the blood-vessels that are altered by exertion, the heart itself and the breathing apparatus also take part in the change. The breathing becomes quicker and the action of the heart both quicker and stronger. The various

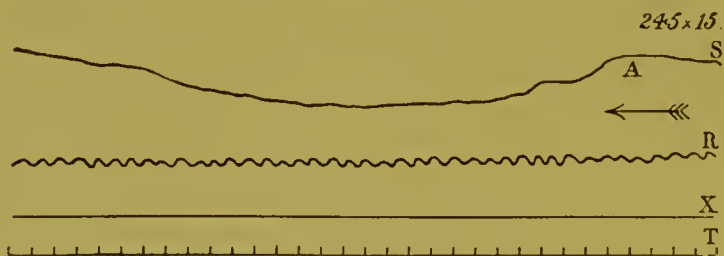
FIG. 3.



Mosso's Plethysmograph. The index is represented writing on a revolving cylinder.

organs of the body are so closely connected together that one affects the other in a way we would hardly dream of until we actually make the observation. If you wish to test this for yourself, get a friend to bend his forefinger and keep it bent

FIG. 4.



To show the contraction of the vessels produced during the process of multiplying 245 by 15. S, Volume of left arm. A, marks the point at which the calculation was commenced; after this point the pressure falls. R, Respiratory movement of chest. X, Abseissa. T, Time line; every upright marks an interval of five seconds.

while you try to straighten it. While you use one hand to do this, put your other upon his forearm and you will feel the muscles become hard. Then put your hand half way between his elbow and shoulder, and you will probably feel the same thing, and then putting your hand upon his breast you may find that the muscles there are also taking part, so that in the very

simple act of bending the forefinger you get the muscles of the hand, arm, and upper part of the body all thrown into action at once. Nor is this all, for if you count the pulse before and after, you will find that it has become more rapid after the exertion, and probably respiration will become quickened as well.

We thus see that the very simplest movement affects the heart and lungs as well as the muscles. Now it is just possible that there are some here who may not know exactly what muscles are. I should not dare to assume this if it were not that in one of his novels Sir Walter Scott makes the mistake of saying that one of his characters had not an ounce of superfluous flesh on his limbs, they were all muscle. Now flesh and muscle are identical, and the red flesh which you see in a butcher's shop is simply the muscles by which sheep or oxen move their limbs. In shortening, so as to pull upon the bones and move the limbs, a certain amount of waste takes place in the muscle, a certain amount of material is used up, and a certain amount of what we may call muscular ash is formed. Now this muscular ash first produces fatigue and weakness in the muscle, and would ultimately paralyse it altogether, just as the ash of the fire will finally lessen the flame, and if not removed will finally put it out. In order to supply the muscle with fresh material and remove this waste, more blood flows into it when it has been set in action. This increased circulation not only tends to prevent exhaustion of the muscle, but ultimately causes it to become larger and stronger; and everybody knows that if one boy chooses the trade of a blacksmith, while his brother, exactly the same size and strength as himself, chooses to become a clerk, the blacksmith's arm would become much larger and stronger in six months than that of the clerk. But we have already seen by the simple experiment of bending the finger against resistance that the heart and lungs participate even in such slight movements, and with increased exercise to the muscles the heart and breathing apparatus also get more exercise, and they tend to become larger and stronger than before. Nor is this all. The increased waste and the increased circulation lead to greater excretion from the kidneys and skin, and at the same time they produce a greater appetite and a more active and healthy

condition of the digestive canal. Every vital process is carried on more vigorously, and the individual feels brighter, happier, better able for work, and is not only capable of enduring greater exertion, but is better fitted to resist attacks of disease. The uses of exercise are so obvious, that we often hear people say in regard to their friends with ailing health, that if they would only take more exercise they would become perfectly well; but there are great differences in the effects of exercise, according as it is of a suitable character and taken at suitable times or not.

We have already seen that severe bodily exercise should not be taken immediately after meals, although a quiet stroll may not interfere with digestion. A quiet stroll, or as people often call it a "constitutional," has less power than actual exercise for harm, but it has also less power for good, and we shall be disappointed if we expect from it the increased appetite and the better digestion which would follow such exercise as a game of cricket, golf or lawn tennis. There are two reasons for this. One is that in the constitutional the movements of the limbs are less active, the heart and lungs are not stimulated, and moreover, fewer muscles are brought into play than in the games which I have just mentioned, where the arms and trunk are actively employed and not the legs only, as in a constitutional. Another reason is that a constitutional does not help to increase the excretion of bile. Bile is formed in the liver at very low pressure, and will hardly run out unless the liver be to a certain extent squeezed between the diaphragm and abdominal muscles. Now this squeezing does not occur in a constitutional walk, but it does take place when the abdominal muscles are tightened at the same time that a deep breath is taken. By putting the hand on the abdomen you will find that in quiet walking the muscles tighten but very slightly, but in running or walking up a hill they tighten very much more, and a quarter of an hour's walk up a steep hill will do a man more good than a couple of hours' walk on level ground. Where people have not the time or opportunity of walking uphill they may help the liver by one of the movements which are generally taught at the commencement of drill, namely, trying to touch their toes with their fingers while they keep their knees straight.

By doing this a few times morning and night they may keep their livers in order, and sometimes avoid the depression of spirits, melancholy and discomfort, which are associated with hepatic disorder. At the same time pressure upon the intestines, either by the exercise of cricket or tennis, or such movement of drill as I have mentioned, tends to make them act and lessens the necessity for continuous dinner pills. But in some people the muscles of the abdomen, through long disuse, have become so feeble that they have little power either to squeeze the liver or intestines. What is to be done in such cases? The best thing is either to have them subjected to a course of massage, or, if this is not available, to use such exercises as will increase them, beginning with very gentle movements. One exercise is to lay hold of the back of a chair so as to prevent oneself from falling, and then to raise first one foot and then the other as high as possible in front. In his book on *Training*, Sandow describes another exercise, which is to lie on the back in bed or on a sofa and raise both legs with the knees straight as high as possible into the air. Much the same result is obtained in a more graceful way by letting the legs remain on the bed and raising the body into a sitting position, or even bringing it further forward. For the development of the chest there is perhaps no exercise better than that which Nature has pointed out as a relief to fatigue, namely, yawning, for in this action the chest is expanded to the utmost both by the ordinary inspiratory muscles and by the accessory muscles connected with the arms. In cases where chest expansion is deficient, either from arrested growth in children or from disease of the respiratory passages or pleura, the movements of yawning repeated several times tend to increase the chest capacity. But this should be done where the air is clean and fresh and free from germs, because more air is drawn in and it is drawn more deeply into the chest than in ordinary breathing, so there is a greater chance of microbes getting deeper into the lungs, if any should happen to be present in the air. Movements like those of yawning, though perhaps less extensive, occur when a skipping rope is used backwards, and I do not think there is any better exercise for children with imperfect expansion of

the chest than skipping backwards. The movement of skipping forwards is not nearly so good, as the inspiratory muscles are not used to the same extent, and the action tends rather to contract the chest than to expand it. This also is the case with bicycle riding, which tends to narrow the chest and cause a more or less permanent stoop. Now cycling has become such a very general amusement that we must consider its effects upon the body, and compare them with those of other physical exercises, and especially with lawn tennis. Lawn tennis as an amusement seems to be less general than it was some years ago, and on asking people at garden parties whether they will play lawn tennis, many of them say they have come by a cycle and have some distance to cycle back, so they would prefer to play something casier, such as croquet. Now of late years it is a matter of general remark how tall and strong the girls are who are to be seen in ball rooms as compared with what they used to be twenty years ago. It is a curious coincidence that this increased growth seems to have occurred along with the introduction of lawn tennis—possibly it may be due to it.

We have already seen that increased exercise tends to make the muscles grow larger, and that at the same time the heart and lungs are stimulated. Now stimulation of the circulation and respiration increases the nutrition throughout the whole body, and when not overdone will tend to cause increased growth. The effect of over-exertion and over-stimulation we shall have to consider later on. It is very interesting and instructive to compare the sketches in *Punch* of girls playing croquet by Leech, and a game of lawn tennis by Du Maurier. In Leech's sketches we see that the girls are much smaller, the exertion they make is slight, and their movements are not only stiff but they exercise only a few muscles; while Du Maurier's girls are tall, strong, lithe and graceful, and in striking the ball put every muscle in their body into active exercise. Now in lawn tennis or polo there is more general movement of the whole body than in croquet, cricket or golf, and it is just possible that the increased growth in recent years of girls, as compared with their brothers, may be due to more general exercise of the muscles in lawn tennis by them as compared

with the more restricted action in playing cricket. But in all the games that I have mentioned there is one essential, viz., intermittent action* (*vide* Figs. 5, 6, 7 and 8).

Exercise which puts in action every muscle of the body, but does not put any one into action for too great length of time at once or in too violent a manner, is exceedingly beneficial. It causes increase of strength and endurance in the muscles themselves, it augments the respiratory power, it makes the heart stronger and the circulation more active, and indirectly increases the power of digestion and the activity of the mind. It thus causes a sensation of well-being, bodily and mental, and enables the individual to resist all the various destructive agencies, microbic and climatic, which tend to produce disease, and so it tends to preserve health and prolong life.

Such are the effects of exertion, but very different indeed are the results of over-exertion. When muscles are over-exerted and kept in action too continuously we find that they grow smaller instead of larger, they become liable to spasm and pain, so that in certain trades where the workmen are over-strained we get paralysis of those muscles upon which the greatest demands are made. Over-exertion also strains and weakens the heart, lessens the mental power, destroys the appetite and renders the individual more ready to succumb to the attacks of disease and to die before his time. Thus the Greek who brought the tidings of the battle of Marathon to Athens, notwithstanding the health and strength which enabled him to perform such a feat, fell dead on accomplishing it, and young oarsmen have threatenings of a similar fate after a boat-race, although, fortunately, very few of them actually succumb. Every one knows that while moderate exercise tends to produce appetite, yet long and exhausting exertion tends to destroy the appetite, and even to produce actual sickness, as one finds in mountain climbing. Nor would any one expect an oarsman

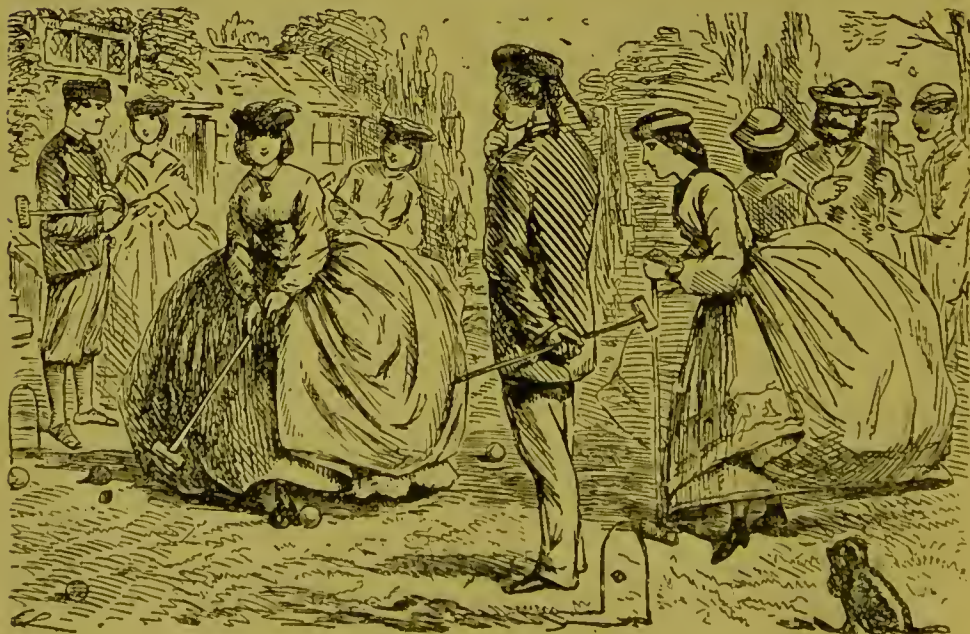
* The longer intervals between the active movements in driving a ball in golf make this game especially suitable for those to whom the greater strain or shorter intermissions render lawn tennis, polo or cricket unsuitable. It is thus particularly useful to men who are prevented by their occupations from keeping themselves in continuous training, or for those whose advancing years render the limbs less supple and the arteries more rigid.

FIG. 5.



A constitutional walk. "An agreeable duty" (after Leech).—*Punch*, March, 1848, vol. xiv, p. 124. (By the kind permission of the proprietors of *Punch*.)

FIG. 6.



Croquet. "A nice game for two or more" (after Leech).—*Punch*, Aug. 17, 1861. (By the kind permission of the proprietors of *Punch*.)

FIG. 7.



Lawn Tennis. "A modern tournament" (after Du Maurier).—*Punch*, Sept. 3, 1881. (By the kind permission of the proprietors of *Punch*.)

FIG. 8.



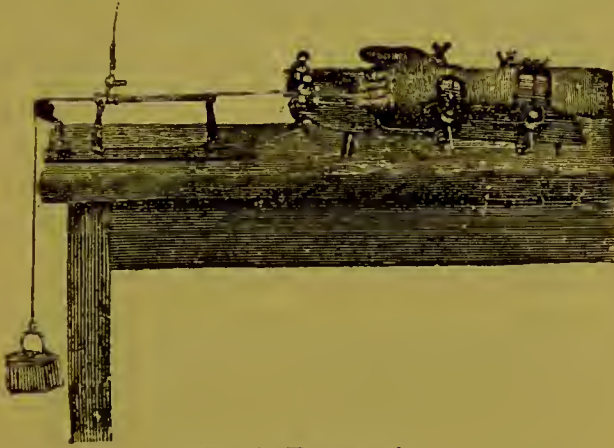
Polo. "The lists at Hurlingham" (after Du Maurier).—*Punch*, July 24, 1886. (By the kind permission of the proprietors of *Punch*.)

after a boat-race or an athlete after running a mile or exerting himself in throwing the hammer or putting the stone, to solve a mathematical problem or do a Greek translation with the same facility that he might possibly be able to show at other times.

Now what is the difference between exercise and over-exercise? This question can only be answered in general terms for the simple reason that what is exercise for one man is over-exercise for another, or may even be over-exercise for the same man under different conditions. Nay more, what is sufficient exercise for the muscles may be over-exercise for the heart, and one of the risks which schoolboys sometimes run is that their athletic power may be judged by their masters or schoolfellows according to their apparent size and strength, and not according to the strength of their heart. To answer the question how much exercise a boy or a man shall take is like saying how much food he shall take. We can lay down general rules, but we cannot be sure that these will apply rightly at all times. But just as appetite regulates the amount of food that a person ought to take, so the amount of exercise is regulated by the sensations of fatigue which show that exercise is becoming too much for the muscles, or by pain in the side which shows that the heart is becoming over-strained. Now sensations of fatigue, like all other sensations, are perceived by the brain, but the condition which gives rise to these sensations is present in the muscles. The energy which enables an express train to rush along from York to London at the rate of fifty miles an hour is supplied by the combustion of coal in the furnace, and the energy which enables our muscles to contract is supplied by the combustion of certain substances in the muscle itself. In both cases the combustion leaves an ash behind which, if not removed, would in the locomotive choke the furnace and put out the fires, and in the muscle first weakens and then abolishes its power of contraction. This effect of the accumulation of waste in the muscles has been beautifully shown by my friends Professor Kronecker of Berlin and Professor Mosso of Turin. I take from Professor Mosso's work on *Fatigue* a tracing which I will show in the lantern. This was made by putting the middle finger into a loop at one end of a

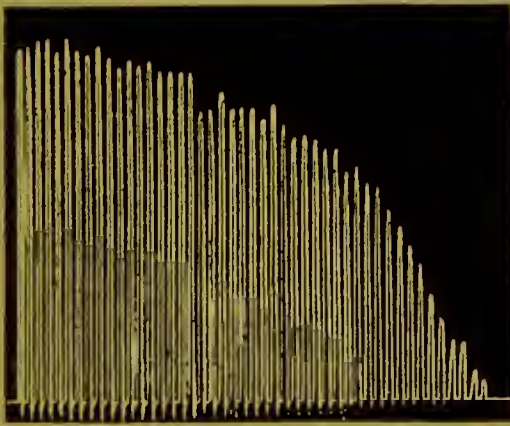
string, the other end of which passed over a pulley and was attached to a weight (Fig. 9). In the middle of the string a small point was fixed which worked upon a revolving cylinder.

FIG. 9.



Mosso's Ergograph.

FIG. 10.

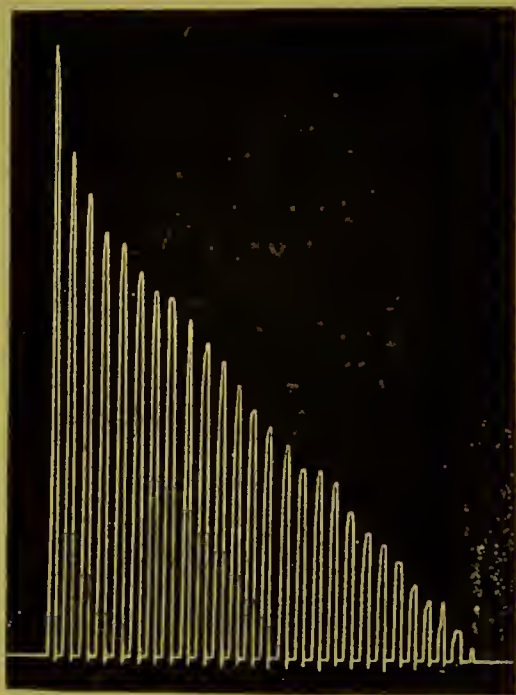


After Mosso. Exhaustion curve of finger in healthy man from voluntary movement.

covered with soot, so that each mark of the tracer could be distinctly seen. The middle finger was then contracted so as to raise the weight at intervals of two seconds. The amount of contraction is shown by the height of the up stroke, and you will see that as the exercise went on the contraction became shorter and shorter till at last exhaustion became complete and

the finger ceased to move. I have already said that fatigue is a complex thing, and is partly due to the state of the muscle which causes it and partly to the state of the brain which perceives it. To show how much is due to the muscle, Mosso caused the finger to contract by stimulating the finger directly by means of electricity, and I now show you a tracing obtained

FIG. 11.

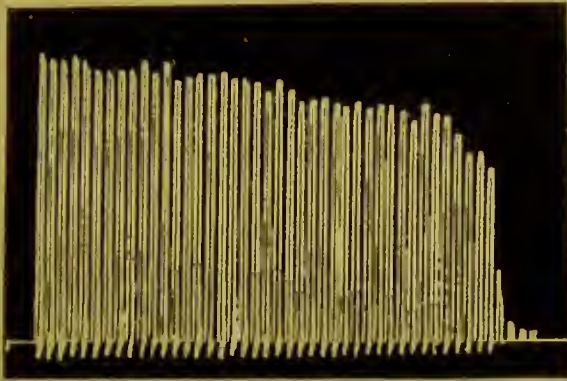


After Mosso. Exhaustion curve of finger in healthy man where the muscles are caused to contract by electrical stimulation.

in this way (Fig. 11). You will see that it corresponds somewhat but not exactly to the first tracing, in which the fall was not a steady one, and was slow until about the end of the exercise. This difference you may fairly attribute to the action of the brain, which made the individual use his will more when he began to feel the muscles failing. But there is an enormous difference between different men, as is shown in the next two tracings, in one of which the finger has continued to contract with very little diminution up to the point of complete failure

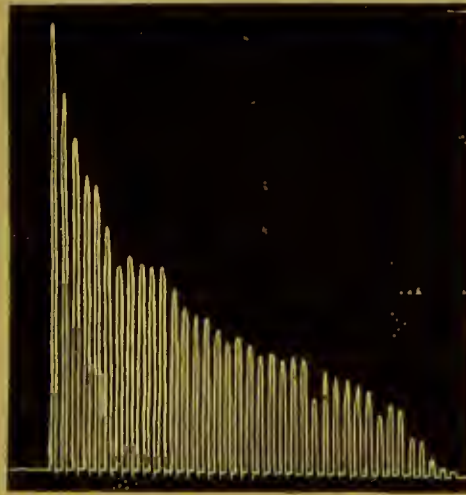
of the muscle (Fig. 12), while in the other (Fig. 13) the fall of the curve due to fatigue is very rapid.

FIG. 12.



After Mosso. Tracing from Dr. Patrizi, showing long-continued movement and abrupt failure.

FIG. 13.



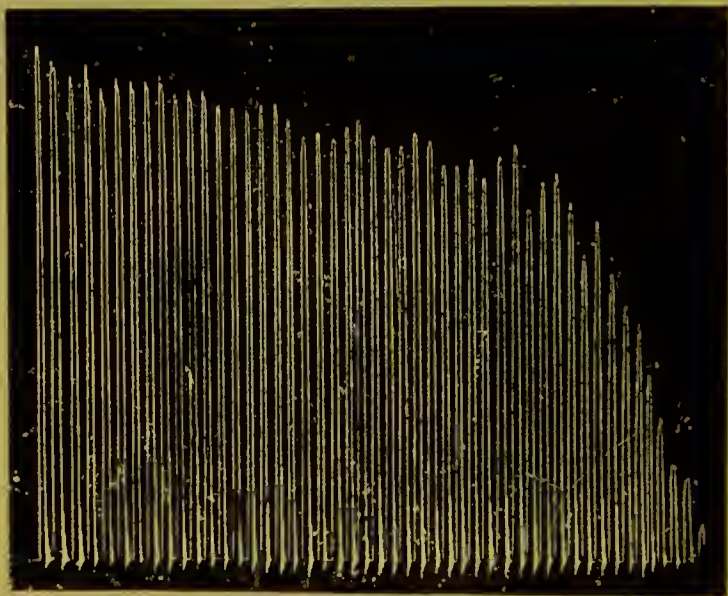
After Mosso. Tracing from Dr. Maggiora, showing rapid but gradual failure from fatigue.

Mental exertion, especially anxiety, tends to make the muscles more easily fatigued.

Now why is it that the muscles become so exhausted by exercise, and yet men are able to go on doing severe work for hours and hours together? The reason is that during contraction the blood-vessels of the muscle dilate and allow the blood

to run into it, bringing new material and helping to carry away the products of waste. But the very contraction of the muscle itself tends to squeeze the blood-vessels and prevent the blood flowing through it. Consequently the greatest flow usually occurs after the muscle has ceased to contract. It is, however, evident that if a muscle be kept contracting too continuously, or if its contractions come too closely together, it will not receive as much blood as it ought, its products of waste will

FIG. 14.

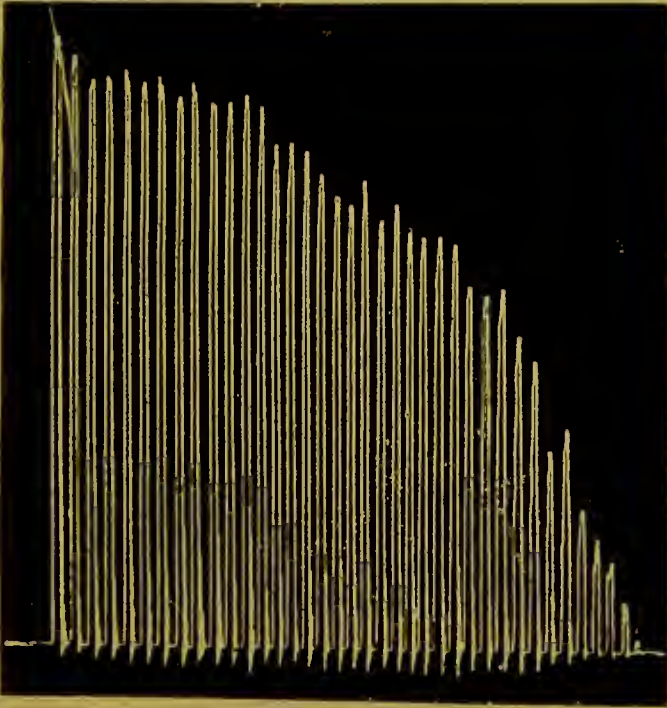


After Mosso. Normal tracing from Dr. Maggiora.

tend to accumulate, and it will consequently become soon exhausted. The most useful exercise is the one which puts many muscles into action by alternate exercise and rest, so that while one is contracting the others are relaxing. On the other hand a continuous strain upon one set of muscles is not only painful and exhausting, but injurious. Every one knows how much easier it is to walk than to stand still, and if we are obliged to remain in one place we involuntarily throw our weight first on one leg and then on the other, so that we get the muscles of each acting alternately. It is this continued strain, however, that makes it so hard for people who are obliged to stand still

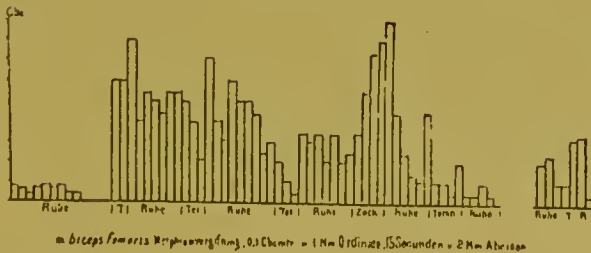
such as teachers, shop-men and shop-girls, who are upon their legs a great part of the day and are unable to walk more than two or three paces at a time, and yet cannot sit down because they have to make slight movements from place to place. To meet this a teacher's rest has been made, consisting of a small sloping board attached to an upright support, which is fixed in

FIG. 15.



After Mosso. Tracing from Dr. Maggiora, when fatigued by giving a lecture.

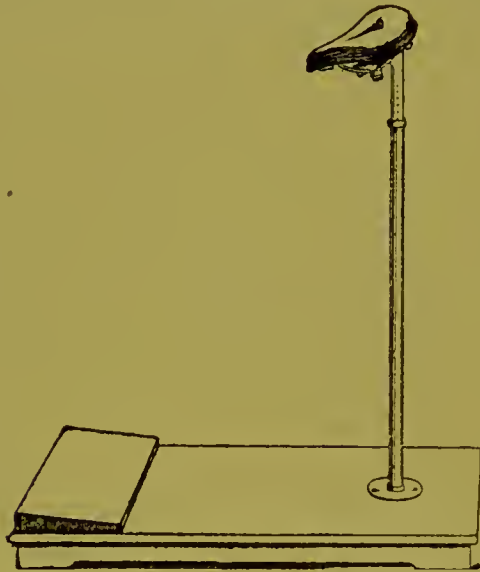
FIG. 16.



After Ludwig and Sadler. The marks along the base lines indicate seconds the height above the base line indicates the amount of blood flowing from the veins of the biceps of a dog during tetanus (T or tet), during rest (Ruhe), or during simple contraction (Zuck).

a piece of board about 3 feet long and 2 feet broad. Against this the teacher rests his weight, keeping the whole thing steady. I have had this rest, which does not take the weight of the body off the legs, modified by substituting a bicycle saddle for the sloping board. By means of this contrivance one can sit down and have the weight of the body taken off the legs, yet it hardly interferes with the movements from place to place when these are desired. By devices of this sort, which

FIG. 17.



Teacher's rest. In the above model the saddle is fixed at any height by means of a pin, but in more finished instruments this should be done by a lever or screw. This model was made for me by Messrs. Hammer & Co., 370, Strand, W.C.

enable muscles to get alternate periods of rest and action, we may to a considerable extent prevent fatigue. But it is evident that the recuperation of a muscle will depend not only on the quantity of the blood which it receives, but also on its quality, and probably there is nothing which affects this so quickly as eating and drinking, and if we can keep the standard of blood up to a certain nutritive maximum we shall also be able to lessen fatigue. Some years ago my friend Dr. Mitchell Bruce and I were taking a walking tour in the Austrian Tyrol. By chance we found that if we ate something, however little, we

could walk the whole day long without getting tired. We thought we had made a grand discovery, and we intended to announce it to the world as soon as we got back. One day, however, in crossing a glacier we sat down to have our lunch, and as the guides would not allow us to start immediately after dinner we began to read our Baedeker's guide-book in order to pass the time. By chance we turned up the general directions for travellers which are placed at the beginning of the book, and as far as my experience goes usually remain unread. At any rate neither Dr. Bruce nor I had ever thought of reading them. Here, however, to our great disgust we found that the author said, "Travellers are advised to eat something every two hours in order to avoid fatigue, which might otherwise come on while crossing the ice." Since that time I have found that guides in Switzerland are well acquainted with this fact, and they generally make you sit down and eat every two hours whether you are hungry or not.

In healthy people under ordinary circumstances a longer interval is convenient and is perhaps often better, but when an individual is enfeebled by disease the same precautions against exhaustion are required in him, although he is taking little exercise, or is even lying quiet in bed, and doctors therefore direct that the patient shall be fed every two hours whether he wishes it or not, just as the guides on the Alps direct that healthy men who are undertaking extraordinary exertions shall partake of food at this interval, whether they wish it or not. More especially is feeding at intervals of two hours necessary in those who are suffering from fever, because in them the body loses as much energy in the form of heat as would have sufficed to carry it through very great exertions. But there is an old proverb that there is many a slip between the cup and the lip, and any amount of water in a cup will not quench a man's thirst unless he gets it into his mouth; and in the same way it does not matter how good the blood is in the body generally if it does not reach the muscles. Now how are we to get the blood flowing freely through the vessels in people who cannot take exercise, either because their muscles are too feeble, as in convalescence, or because their bodies are too heavy and fat, or

because their hearts are too weak to stand the strain of exertion ? The answer to this question is that we can do it by means of massage, which has the double effect of dilating the blood-vessels in the muscles, and thus increasing the circulation through them, and of clearing away the products of waste through the

FIG. 18.

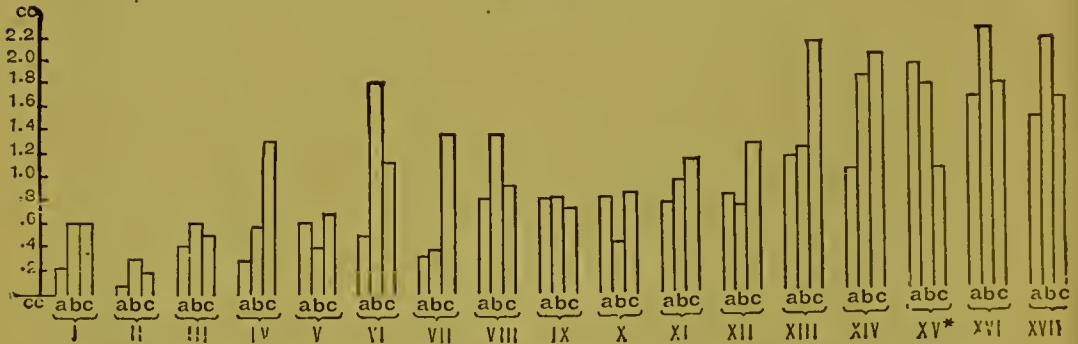
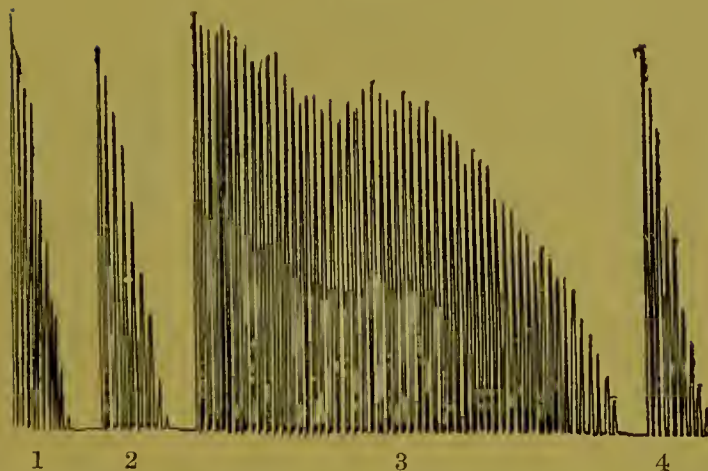


Diagram to show the effect of massage on the flow of blood through muscle; a, shows the amount of blood in cubic centimetres which flowed from a muscular vein when it was simply opened; b, during massage; c, after massage.

lymphatics. The power of massage to clear away waste is very extraordinary, and it has been shown by Kronecker, that if a frog's muscle be made to contract till it is completely exhausted, it will begin to act again quite briskly if simply kneaded so as to press out the muscular ash, as we may term it. The use of massage has been known to the Hindoos and to the South Sea Islanders from time immemorial, and I do not know that there is anything that strikes one as more extraordinary in the ancient Romans than the fondness that they had for baths and massage, and the regularity with which they erected baths in every town having the slightest pretensions to importance. But the muscles when put in exercise have the power of massaging themselves, because every contraction squeezes the waste products of the muscles up through the lymphatics; and a course of training exercises enormously increases muscular power and endurance. But in order that the training should have its full effect, it requires to be continuous and requires to be gentle, and I think no better example of training is to be found in the story, whether it be true or false, of Milo the famous

FIG. 19.



After Maggiora and Vinaj. *Blät. f. Klin. : Hydrotherapie*, 1892, p. 6. 1. The fatigue curve of the left hand raising a weight of 3 kilogrammes every two seconds. 2. The fatigue curve of the right hand. 3. The fatigue curve of the left hand after five minutes' massage. 4. That of the right hand without massage.

FIG. 20.

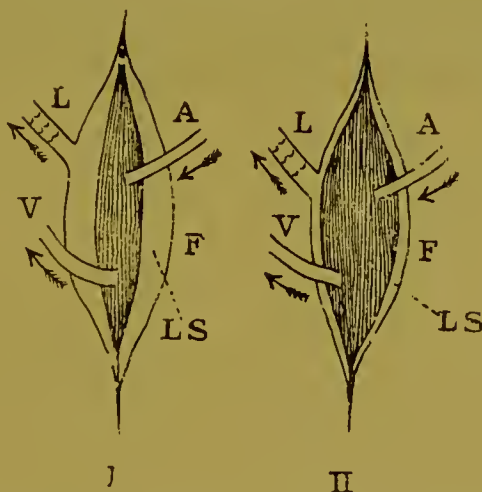
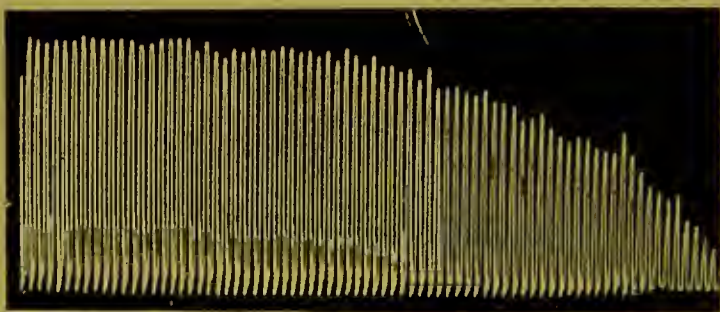


Diagram of longitudinal sections of muscles, I in relaxation and II in contraction. F is the fibrous fascia or sheath of the muscle. LS a lymph space between the muscle and the outer layer of fascia. L is a lymphatic vessel with numerous valves, by which the lymph containing waste products is removed. A is an artery by which fresh blood is brought to the muscle; and V is a vein by which blood is removed from it. Each time the muscle contracts, as in II, it lessens the size of the lymph space and drives the lymph onward through the lymphatics. Each time it relaxes it tends to create a vacuum within the fascia, and thus lymph is sucked out of the muscle into the lymph space, while fresh arterial blood rushes into the muscle.

wrestler of antiquity, who was able at last to carry a full-grown bull on his shoulders by beginning with it as a new-born calf. Day by day he carried it as day by day it grew, and as it increased in weight so did the wrestler in strength, until at last he carried a full-grown bull with the same ease as a new-born calf. I remember a friend once remarking to me that, in walking up a hill, he took the greatest possible care not to lose a single step but to walk steadily uphill, because, he said, one step downwards was like a vote in the House of Commons which counts for two, because you have one to the bad instead

FIG. 21.



After Mosso. Showing the effect of training, in increasing endurance as compared with Fig. 10, from the same person. Owing to a difference in the apparatus the height of the curves is not comparable. The amount of work done was really double that in Fig. 10.

of one to the good. It is therefore important not to lose a step in training, but to go steadily onwards, though so gently as to prevent the necessity of stopping or going back.

But fatigue and over-fatigue do not act only upon the muscles, they act upon the respiration and heart. The effect of a quick run is known to us all, and so a person who is either too stout or is very bloodless will, on running upstairs, have to stand at the top unable to speak, so that in many cases time is really lost instead of saved by running up quickly instead of walking upstairs slowly. But perhaps we do not all know what the cause of this quickened breathing is. It is really due to poisonous products which are formed by muscular action. This has been shown by a very interesting experiment. If a dog is poisoned by opium

so as to be quite unconscious of all that is going on, the blood from another dog may be injected into his veins, and his breathing and heart may remain quiet as before. But if another dog has his muscles put into powerful action and some of his blood is then injected into the sleeping dog, the pulse and respiration of the latter become quickened, just as if he had been taking exercise instead of lying quiet and senseless all the time.

As the muscles become trained they form these poisonous substances in less quantity, and so people who could previously hardly run at all, on account of the breathlessness it produced, may be able to take very active exercise indeed without any shortness of breath. But the shortness of breath is not all due by any means to a condition of the muscles. It is due in very great measure—in greatest measure perhaps—to alterations in the heart.

In ordinary exercise the two sides of the heart work steadily together, and the right side drives the same quantity of blood through the lungs at each beat as the left drives through the body. But when the exercise is too violent this balance is disturbed, the blood rushes more quickly through the vessels of the muscles into the veins than it can get back through the vessels of the lungs, and thus the right side of the heart becomes engorged and distended. The distension may become so great that the heart can no longer empty itself, and the man or the animal falls dead, as in the case of horses that used to be ridden hard to bring a reprieve to a condemned criminal, or a stout old gentleman who has hurried to catch a train. Even healthy hearts suffer in this way, and they may become more or less permanently damaged, for when the heart becomes much dilated the valves that ought to prevent the reflux of blood become too small for the orifices they should close, and thus we get symptoms of valvular incompetency. This condition is most likely to occur when the heart is insufficiently nourished, as in old men in whom the arteries of the heart are narrowed by atheroma, or in young girls in whom the blood is impoverished by anæmia, when every exertion may bring on dilatation of the heart. Even in healthy individuals Dr. Schott, of Nauheim, has

shown that this occurs by taking a photograph with the Röntgen rays before and after exercise. Such dilatation usually causes pain and a feeling of constriction over the cardiac region, and

FIG. 22.

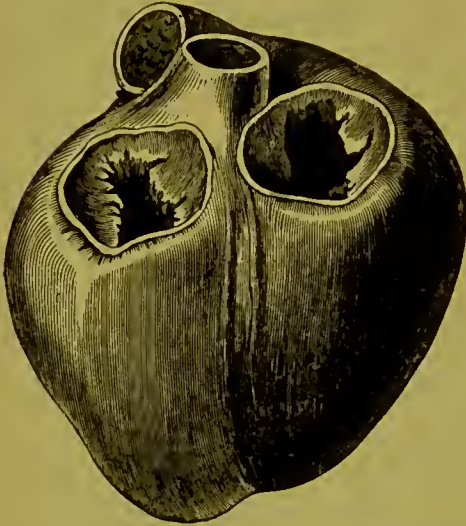


FIG. 23.



FIG. 24.



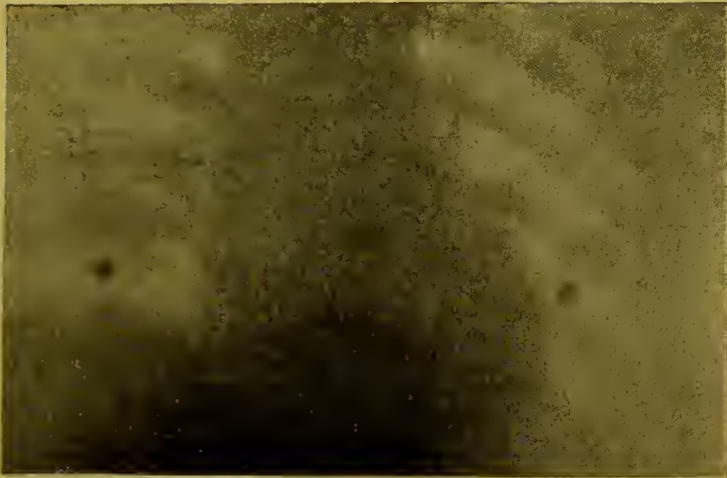
FIG. 22.—Heart fully distended, showing insufficiency of the valves to close the mitral and tricuspid orifices (seen from the back and the auricles removed, so as to display the auriculo-ventricular orifices).

FIG. 23.—Heart in full systole, showing the mitral and tricuspid orifices so diminished by the muscular contraction that the valves close them easily (seen as in Fig. 22).

FIG. 24.—The same heart as in Fig. 23, seen from above.

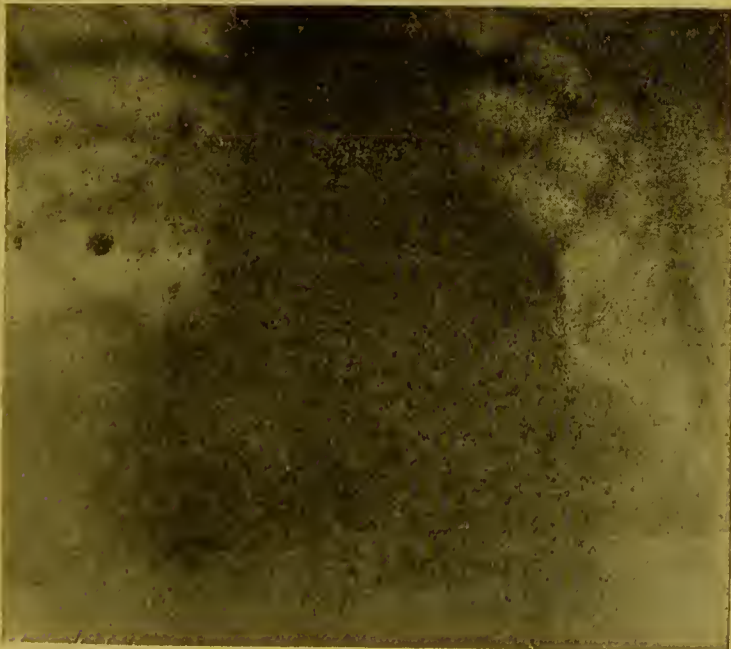
the enfeebled circulation may lead to a sudden syncope. These are the conditions to which over-exertion is most likely to give rise in boys at school who go in for long paper chases, in which a great strain is made both on the strength and endurance of the

FIG. 25.



After Dr. Th. Schott. Photograph by the Röntgen rays, showing the heart in a healthy man before exertion.

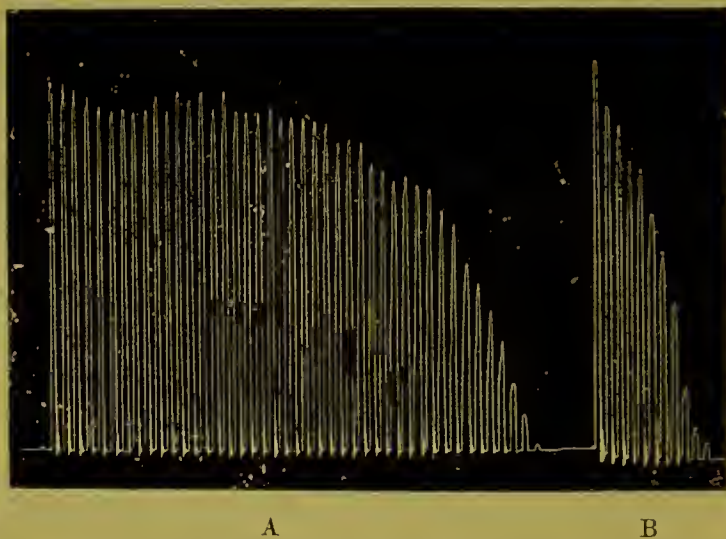
FIG. 26.



After Dr. Th. Schott. Skiagraph of the heart of the same man as Fig. 25, after violent exertion, showing temporary dilatation.

individual. A similar condition also takes place in football, in which the exertion for a time is exceedingly great, although it is not continued so long or so steadily as in the case of a paper chase. But in growing boys both these games may lead to distinct strain of the heart, and this is all the more likely to

FIG. 27.



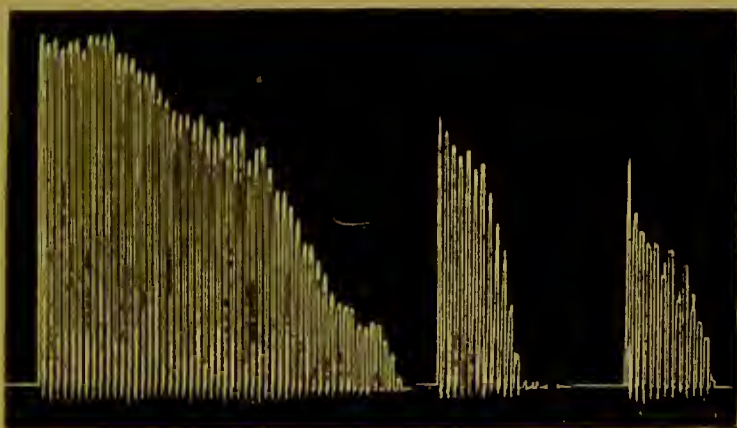
After Mosso. Voluntary contraction. A, Before conducting an examination.
B, After examining nineteen candidates.

occur if the boys are growing rapidly, for not only are the tissues as a rule softer and looser, but the boy is called upon to make exertions calculated according to the size and strength of his muscles, and not according to the strength of his heart. In all exercises attention should be paid to the condition of the heart, as excessive demands made upon its strength are most injurious in growing boys, and should be prevented, although regular exercise is most useful and beneficial.

But there is another factor which must not be lost sight of in exercises for boys and young men, and that is, that mental fatigue causes bodily exhaustion. This is apparent from the slides which I now show you (Figs. 27 and 28). You will see that in these the subject of experiment has been able to contract his finger many times in succession and thus raise a considerable weight before an examination. After an examination you will

see the same individual contracts his finger only a few times and is then exhausted. This fatigue affects the muscles as well as the nervous system, for in Fig. 28 the curve was obtained by

FIG. 28.



A

B

C.

After Mosso. Exhaustion curve from electrical stimulation. A, before examination. B, Immediately after examination. C, Two hours after close of examination.

stimulating the muscles directly by electricity. It is therefore evident that if boys are hard pushed at lessons and at exercises also they are much more likely to break down than if they were pushed at either the one or the other alone. Like other muscles, the heart in adolescence is more easily strained, but is also more ready to recover itself, and, with moderate care, will recover itself completely. Thus I have had as a patient a boy who grew very quickly, and was very tall and strong for his years. At the public school where he was he was encouraged to go in for athletics according to his apparent size and strength, but one day while sitting at his desk quietly in school he suddenly fainted. On examining him I found that he had got a dilated heart, and I explained to him that if he went on with athletics it was very likely that when he was old enough to go to college his heart would not be strong enough to allow him to enter for boat races, but if he would only take care of it and go in for moderate exercise without any severe strain he would be able for anything when he grew older. He was a sensible

boy, he took my advice, and its correctness was shown by the result.

In middle age the heart is less liable to strain, but as age advances, and especially if the arteries become atheromatous and the coronary vessels become narrowed, the heart not only becomes more easily affected by strain, but it has less power of recovery.

In such patients when the muscle of the heart is beginning to yield, and the cavities of the heart become dilated, recovery is slow. Now such dilatation may occur in consequence of the heart itself becoming ill-nourished and weak from several causes. The blood itself may become impoverished from imperfect food, imperfect digestion, or a constant drain such as that caused by hæmorrhoids; or while the blood is normal its supply to the wall of the heart may be diminished in consequence of atheromatous degeneration of the coronary arteries; or the strain upon the heart may be too great on account of the high blood pressure in persons with kidney disease; or dilatation may occur from over-exertion in middle-aged or elderly people just as it may in the young, or finally it may occur in consequence of valvular disease. In all cases where dilatation has occurred it is of the utmost importance to remove the causes, if possible; to correct the condition of the blood; to lessen the tension in cases of kidney disease, and to remove any cause of undue strain that may be present from the ordinary avocations of the individual, or from extra exertions which he may be likely to make in consequence of his natural temperament. Where the mischief is only slight it may be controlled to a great extent by careful training, just as in the case of a boy or youth, by constant steady exercise, avoiding with the utmost care any over-strain—*e.g.*, I am often asked by middle-aged people whether they may cycle or not, and my usual answer to those people is that they may do so under certain conditions, viz., that they shall not go too fast or too far, nor cycle uphill.

When dilatation has actually begun to interfere with the power of the patient to take ordinary exercise we must restore the heart. In many cases this can be done to a very great extent by the combined use of movements and baths, which has lately

come so much into vogue under the name of the Nauheim treatment. Two or three years ago I recommended this treatment to a young officer who had strained his heart by carrying a heavy man for a wager. His ordinary medical adviser pooh-poohed my advice on the ground that the Nauheim treatment was too new and too uncertain for him to sanction its employment. Such an objection is now out of place, for the utility of this method of treatment has now become generally recognised and it is largely patronised in this country.

The essence of the treatment consists in the combined use of baths and movements. By the baths a stimulus is applied to the skin which acts reflexly on the heart and circulation, slowing the beats of the heart while rendering them more powerful. The movements at first are few and gentle, and their number is gradually increased, while the resistance opposed to each movement is the essential part of the treatment and is so gradually augmented that almost imperceptibly the patient is led to take a considerable amount of exercise, and that of a fairly severe nature, before the end of the course, while the increase day by day is so slight that it is almost imperceptible. The plan is now employed as an addition to the ordinary baths and waters at some of our known best health resorts, as Buxton, Harrogate, Bath, and Sidmouth, while at Llangammarch, in Wales, not only is this treatment carried on, but the place is arranged with sloping walks of gradually increasing steepness, so that the patients gradually take more and more severe walking exercise and thus continue the cure which has been begun by the resistance of movements and baths. But there are many cases where the disease of the heart is too severe to allow of treatment by baths or movements at all, where the right heart is failing, the legs are failing, fluid is collecting in the abdomen, and the bases of the lungs are becoming oedematous, so that the patient is quite unfit for any exercise whatever. In such cases the best plan of treatment is to keep the patient absolutely quiet, and to allow of no exertion whatever. Now absolute quiet is a term which the patient is very likely to misunderstand. He will ask, "May I get up on the sofa? may I not get up for the wants of nature?" But the answer to this

question must be "No, on no account whatever. You must remain absolutely quiet in bed; every voluntary movement that you make tends your heart to beat more quickly, and it is at such a low ebb that you must save it every beat you can." But if one keeps the patient so absolutely quiet with a feeble failing heart there is a natural tendency to stagnation in the extremities. This must be prevented by massage. The hand of the masseur or masseuse acts as an accessory heart, pressing the blood up and onwards to the heart, and by thus making room in the capillaries it lessens the resistance to the outward flow in the arteries. But more than this. By compression of the muscles the arterial flow is gradually increased, so that by massage we aid the feeble heart in a double way. We lessen the resistance it has to overcome by dilating the capillaries, and we help the circulation by pressing the blood onwards into the veins. Nor is this all. We also press on the lymph from the tissues. We thus maintain a proper tissue-metabolism, we increase the appetite, and eliminate waste. In this way we find that many cases, whom at first sight we might regard as practically moribund, recover in a way that is little short of marvellous, and perhaps there is no class of cases that so well repays the care and attention of the physician as those of bad cardiac disease.* But this subject I have already treated elsewhere, and my intention to-day has rather been to bring before you the good effect of exercise in preserving or restoring health, in giving a feeling of well-being and enjoyment of life, increasing strength and the power of resistance to disease, and of helping the development, both physical and mental, of the young. I have tried also to bring before you the bad effects of over-exercise in tending directly or indirectly to bring about disease, to destroy the enjoyment of life more or less permanently, and to diminish the power of work. More especially would I desire you to remember that mental exercise may produce physical exhaustion, and that to press either a growing boy or girl at the same time with hard mental work in the form of examinations, and with too much physical exercise,

* Lauder Brunton, "Rest and Massage in Cardiac Disease," *Practitioner*, vol. xli, No. 3.

even though it should be in the form of play, is a great mistake.

Years ago I thought it was impossible to have too much of a good thing, and in the self-sufficiency of youth I was inclined to regard Solomon as somewhat foolish when he said, “Be not righteous overmuch, neither make thyself over-wise, why shouldst thou destroy thyself?” The advance of years has taught me better, and I now acknowledge the wisdom of Solomon, and venture to apply his dictum to the body as well as the mind, and advise my medical brethren, as well as those who have the charge of youth, to take care that they shall neither try to make those who are under their care over-wise or over-strong, either by undue exertion of mind, of body, or of both.



PERCUSSION CAPS FOR SHOOTING IN SCHOOLS.

Nature, May 17th, 1900.

The extraordinary explosive power of fulminate of mercury is known to all chemists, but it is not generally known that the explosion of a percussion cap on a gun will cause a current of air sufficient to extinguish a candle at a distance of ten or fifteen feet. The distance, of course, varies with the length and bore of the gun, and with the nature and the size of the candle. The gun must be pointed at the lower part of the wick, and in order to blow out the candle the aim at this distance requires to be nearly as accurate as would be required to make a centre with a rifle at a hundred yards. In a speech to the Primrose League on May 9, Lord Salisbury mentioned the expediency of every man having the chance to learn to handle a rifle within reach of his own cottage. By beginning with percussion caps children might be taught to handle a gun at such an early age, that, in case of invasion of this country, boys of fourteen might be able to act as soldiers, as they are said to be doing amongst the Boers at the present time. The objections to training children to handle a rifle are, first of all, the danger of the child shooting either itself or some one else; and secondly, the expense. But the inclination of children to play soldiers might readily be utilised by teaching them to handle first of all a toy gun, and then to practise shooting at a candle with caps. For those who shoot best with caps, the practice with a saloon rifle might be held out as a reward. One single-barrelled old muzzle-loading gun would suffice for many children, and as 240 caps cost a shilling, the expense of providing a gun and material for practice would be very small.

LAUDER BRUNTON.

WAR GAMES FOR CHILDREN.

(Reprinted from *The Times*, January 7th, 1902.)

TO THE EDITOR OF *The Times*.

SIR,—In his poem published in *The Times*, Mr. Rudyard Kipling has struck a note which every true Briton hopes will echo, not only through the Old Country, but through her Colonies. There can be little doubt that the British public takes much more interest in the result of a match at football or cricket than of an important engagement in South Africa. As Mr. Rudyard Kipling has most admirably put it, this is a deplorable state of matters, and must be corrected if Britain is to maintain her position. The first step towards correcting it is to find out why it occurs; and I think the reason is not far to seek. Every man and boy in the country knows what cricket and football are, either from having played themselves or having had friends who played these games. And I think it is partly because human beings often take more interest in their play than in their work that these games excite so much interest, all the greater perhaps because they awaken in many men pleasant remembrances of their boyhood. Do not let us try to extinguish an interest in these games, which are so useful in developing a keen eye, swift foot, and skilful arm, but let us try to divert it in part to other games which may serve a more practical purpose. Let the childish games "I spy," "French and English," and "Prisoner's Base," which are old war games of scouting, capture, and recapture, be adapted to the necessities of modern warfare, and let all children be taught at school, partly in play and partly as work, how to handle a gun, how to shoot, and how to manœuvre. In this way all boys at the age of fourteen would be sufficiently trained to defend the country in case of invasion, and we should possess a sufficient army without recourse to conscription. The war games thus learned in childhood and boyhood would share the public interest in right proportion with cricket and football, so that the country would then be free from the reproach which Mr. Rudyard Kipling has justly brought against it.

LAUDER BRUNTON.

MILITARY TRAINING IN

It is essential that every able-bodied man should, in case of need, be prepared to take part in the defence of his country. It is impossible that he can do this without some form of military education. Modern war demands a highly scientific armament and a nation in which a very small proportion only is trained to arms must be able to consider its requirements when standing in face of the universal military training and high standard of training in the great continental nations.

The recent wave of patriotism which has passed over the country has led to the formation of a considerable number of civilian rifle clubs, with a number of members. This, though decidedly a step in the right direction, is but a drop in the ocean of value unless accompanied by such military instruction as will enable the members to use the range to be applied to bodies in the field.

If pluck and endurance could win battles in the present day, there would be no special thought for the future. But in modern war these qualities are of little value unless supplemented by a military education which is directed so as to develop judgment and resource on the part of individuals, system, order, and discipline. The latter three essentials the youth of the present generation is deficient in.

In the present day the warlike spirit of the nation is easily aroused, but it is such that, in the ordinary times of peace, service in the army does not attract the intelligent mass of the population, and the class from which the army is recruited fails year by year to produce the required numbers to keep the army establishment.

The difficulties of the present situation are now receiving the attention of the authorities. For the future the needs will probably best be met by the cultivation of military spirit in the youth of the nation—such a spirit as may be carried over from the ranks of the regular and auxiliary forces full of men of the present day. To establish in all a skill in arms and a knowledge of military arts and

them because they will not apply their attention to them for a short time. If they were allowed, instead of spending an hour over each, to leave the schoolroom for military plays as soon as they had done their work in either department to the satisfaction of the master, they would probably do it in one-third or one-fourth the time now spent. They would thus learn their writing and arithmetic more thoroughly than they do at present and have plenty of time for military play.

Military training should partly consist of exercises to develop the body as in the German Army, partly of drill and marching such as might be required in case of battle with European troops, and to a great extent of scouting and irregular warfare such as would commend itself more to a boy's love of games. A knowledge of guns and shooting would necessarily form a most important feature in training. Small children of four or five might be trained with toy guns made entirely of wood, and which could be supplied at a penny each or even less. For proficiency in drill with these they might be promoted to aim at a candle with caps, and as soon as they were big enough to manage it, they might learn to take a rifle to pieces, to put it up again, and to clean it. Proficiency in aiming with caps and in working with the rifle might be rewarded by taking the boys to a rifle range which would require to be provided for every school. Probably by means of this plan most of the boys before they were fourteen would have learned a great deal more drill than a soldier would in three years, and they would be able to take their place with grown men at the shooting ranges.

The chief points that we shall have to consider will be the provision of dummies, of Morris tubes, of percussion caps, guns and rifles for board schools, the obtaining and paying for instructors, and the obtaining and maintenance of ranges. The question of time will have to be arranged with some educational authorities, but I think it will be best to try to have some scheme more or less cut and dry before we ask further advice and co-operation.

Sincerely yours,

LAUDER BRUNTON.

MILITARY TRAINING IN SCHOOLS.

IT is essential that every able-bodied man should, in case of need, be qualified to take part in the defence of his country. It is impossible that he can do this without some form of military education. Modern war demands a highly scientific and thorough training, and a nation in which a very small proportion only is trained to arms requires to thoughtfully consider its requirements when standing in face of the universal military service and increasing high standard of training in the great continental nations.

The recent wave of patriotism which has passed over the country has resulted in the formation of a considerable number of civilian rifle clubs, with a membership of some 15,000. This, though decidedly a step in the right direction, is but a drop in the ocean, and is of little value unless accompanied by such military instruction as will enable the individual lessons of the range to be applied to bodies in the field.

If pluck and endurance could win battles in the present day, then our nation need take no special thought for the future. But in modern war these qualities will effect little unless supplemented by a military education which is directed so as to produce intelligent action, judgment and resource on the part of individuals, system, order, and perfect discipline. In the latter three essentials the youth of the present generation is notoriously lacking.

In the present day the warlike spirit of the nation is easily roused, but its military spirit is such that, in the ordinary times of peace, service in the army does not prove attractive to the intelligent mass of the population, and the class from which recruits are mostly drawn fails year by year to produce the required numbers to keep the army up to its peace establishment.

The difficulties of the present situation are now receiving the careful attention of the authorities. For the future the needs will probably best be met by encouraging a proper military spirit in the youth of the nation—such a spirit as may be calculated not only to keep the ranks of the regular and auxiliary forces full of men of the right stamp, but further to establish in all a skill in arms and a knowledge of military arts sufficient to enable them to take their place by the side of the trained soldiers in time of need.

To bring about such a military spirit and knowledge in the youth of the country a properly devised course of instruction in schools is requisite. The course should be framed and applied in a manner to interest the boys, and should form a part of their amusements; it should be a welcome relief from the drudgery of bookwork, and it should enable military skill to be acquired as a foreign language is learnt by a child, without effort or strain.

The general course of instruction would require to be systematic and progressive, commencing with exercises with toy guns, elementary drills and skirmishing, and games calculated to teach scouting, use of cover, etc.; gradually progressing to firing caps, miniature cartridge practice, and more advanced skirmishing exercises: and culminating in cadet corps armed with rifle or carbine and trained to regular military exercises.

A course of drill, often under a Sergeant Instructor, is carried out in many schools in the present day, but the usual instruction, being of what may be called the barrack-square order, has no particular value as a military training. A certain amount of steady close-order drill is necessary to teach proper methods, regularity and obedience to command, but the bulk of instruction should be of a nature to develop intelligence and resource, and to teach the action of extended bodies in the field.

For cadet corps a proportion of army instructors would be needed, but for younger boys the school teachers, assisted by perhaps their more advanced pupils, would be the best instructors. For their use a manual of instructions and exercises should be compiled, and if necessary the practical application of such a manual could be taught them during a short course at Regimental Depôts and Battalion Head Quarters.

A manual of this class should be based on the instructions for the training of infantry, and should deal in simple and concise form with squad drill, physical training, rifle exercises, firing exercises, skirmishing, defence and attack. It should contain general instructions for progressive training of children and boys, and a series of short simple lectures.

The question of ranges is not a difficult one. For children big enough to use a miniature rifle, ranges up to twenty yards can be made with perfect safety in and adjoining school buildings at a cost of two or three pounds; when funds admit, more elaborate construction can be undertaken, ranges being lighted for use after dark and provided with apparatus for moving and vanishing targets. For cadet corps there will always be difficulty in providing open ranges up to full distances. Such ranges, however, need not be considered. High-class marksmanship can be taught at short distances and on safety ranges in the vicinity of towns, and practice on such ranges can be supplemented by an occasional visit to an open range of full extent.

For boys who are of a sufficient age to be taught to shoot, a rook rifle, which is manufactured for about six or seven francs by the Fabrique Nationale des Arms at Liège, can be recommended. It is very accurate, simple, and well-made. For very young children a wooden gun should suffice; this they could exchange later for a gun which will fire a cap, to increase their interest and make their play more realistic.

PHYSICAL AND MILITARY TRAINING IN SCHOOLS.

THE object to aim at is to teach from early youth discipline, bodily activity, accuracy, the habit of observation, and the skilful handling of arms ; and to develop the intelligence of individuals in the direction of thinking and acting for themselves in reference to a common object, and especially with reference to mutual action.

The teaching should consist of:—

Physical Exercises.

Close Order Drills.

Firing Exercises.

Skirmishing.

Estimation of Ranges.

Scouting.

Shooting.

Such a system of physical exercises as Colonel Fox would devise is essential and would be invaluable.

Close Order Drills are of importance only in elementary work. Up to the year 1900 this class of training occupied perhaps nine-tenths of the time of the soldier, to the neglect of war practices, and in schools it is now the only class of training which is attempted. It is supposed to inculcate that most necessary of all military qualities—discipline—but it is nothing more than a survival of the days when men fought in close bodies, and it does not teach the discipline required in the present day, viz., that which is established by education and the cultivation of individual thought and intelligence. Close order drills are harmful by teaching a mechanical precision and a blind obedience which stunts intelligence. Applied with moderation, close order drills are necessary to teach elementary work, such as squad drill, firing exercises, etc.

The firing exercises, which teach the skilful handling of arms, and the correct firing positions, are always most laboriously acquired by the average recruit ; they are rarely **thoroughly** acquired. The importance of these exercises cannot be over-stated, good shooting being entirely dependent on the manner in which they are learnt. Perhaps five per cent. of men will shoot well without any such preliminary teaching, but 95 per cent. have employed their muscles in a manner which has no connection with the handling of a rifle, and acquire the firing motions with great difficulty.

Taught early, the habit of handling a rifle, and of adjusting sights and firing becomes second nature. People may say that the Boers have had no such teaching, and still shoot well ; but they have mostly been accustomed from youth to handle guns, and as a matter of fact their shooting is only **comparatively** good. The nation which takes up the proper training in handling arms and shooting will have an enormous advantage, for at present there is no army which gets anything like the full power out of the rifle.

As to training in the firing exercises the lessons are exceedingly simple. The official manual, abbreviated, is all that is needed.

Skirmishing is interesting and readily learnt if sharpness and individual initiation have not been dulled by too much close order drill. The official instructions, abbreviated and with a few explanatory additions will meet requirements.

Estimation of distance is of no less importance than training in shooting. The official instructions are complete and very simple, and will readily be understood by children. The training is interesting and sharpens the powers of observation.

Scouting is of the highest importance. Everything connected with it is simple, but previous knowledge of skirmishing and estimation of distance are necessary. At the same time it is adapted to games for younger children.

As to Games—Skirmishing, judging distance, shooting with miniature rifles, and scouting, can all be adapted to games with great advantage, and skill might well be stimulated by prizes and competitions. Examples of such training, as adapted to games, will be necessary in order to put those who have to arrange the details on the right lines.

A pamphlet dealing with the various heads of training will be needed, this I shall be very glad to put together.

As to scheme for training :—

The training should be progressive, and suited to the capacity of children and boys of various ages. Three Classes might be formed :—

(a) For the youngest children.

(b) For children old enough to fire caps, and to undertake a fair amount of exertion.

(c) For boys able to use miniature cartridges.

After (c) would come Cadet Corps.

For Class (a). The course might consist of physical exercises and elementary close order drills, the instruction being usually carried out with toy guns.

For Classes (b) (c) the whole of the subjects of instruction.

EQUIPMENT.

Two kinds of guns would be needed. A wooden gun (with arrangement for firing caps) for the youngest children ; a miniature rifle, firing ball cartridges, for the older ones.

A range suited to the latter gun would be needed ; this need not exceed a distance of 20 or 25 yards, and should be supplied with stationary and moving and vanishing targets. Cost, complete, need not exceed two or three pounds.

R. L. A. PENNINGTON (*Colonel*).

THE MILITARY NEEDS OF GREAT BRITAIN.

(Reprinted from the *Spectator*, January 24th, 1903.)

TO THE EDITOR OF THE *Spectator*.

SIR,—In your admirable article in the *Spectator* of January 10th you very truly say: "We shall never have a satisfactory military system in this country till the nation as a whole, and not merely its expert advisers, occupies itself with the discussion of an Army scheme suitable to its needs." There can be no question that at present the nation as a whole is singularly indifferent to matters military or naval, and takes much more interest in cricket or football than in the defence of the country or the consolidation of the Empire. I have no wish to decry these games, which as a means of physical education are most useful; the question is, how to awaken a similar enthusiasm for the means of national defence. The Jesuits, who were the most successful of all missionaries, showed their wisdom by leaving the adults alone, and carefully impressing their views upon the children and youths. It seems to me that it is only by following this plan, and getting children at school to take an interest in shooting and scouting similar to what they now do in cricket and football, that the British nation will be induced to take an interest in national defence, and each man, youth, or boy will be qualified to play a part in defending his country and home should an invasion render it necessary. A little training in the use of the rifle, and in the scouting and irregular warfare that would be required to defend the country in case of foreign invasion, could easily be given to every boy between the ages of seven and fourteen without interfering in the least with education, but on the contrary, helping mental as well as physical development. In discussing physical training with a learned German professor

who is himself a great athlete, he expressed the opinion that the systems of physieal training in Germany and in England were both one-sided, and that a correct system ought to combine the two. The German training in a gymnasium tends to develop the museles and increase the strength of the body equally in all its parts, whilst ericket and football tend to develop the muscles of the legs in excess to those of the arms and upper part of the body. But, on the other hand, games of ball, sueh as ericket, develop the nerve-centres which co-ordinate complex movements, and make the eye, hand, and foot all work harmoniously together for a common end in a way that gymnastie exereises fail to do. English boys as a rule care but little for gymnastics, and dislike the training of a gymnasium because they regard it as work, whilst every form of play they thoroughly enjoy. It is, I think, important that training in the use of the rifle and in scouting should be regarded as play to a great extent by the children, and this, I think, could easily be done, though the suceess of the attempt will depend very much upon the teachers. Two of the most popular of children's games, "I spy" and "prisoners' base," are old war games, and they, as well as "hare and hounds," might with a little trouble be adapted to the forms of modern warfare. One of the objections which have been urged against the training of children in the use of the rifle is that it tends towards militarism: but could any peoples be freer from this than the American settlers, who less than a century and a half ago defeated the British, or the Boers, who but for our great numerieal superiority might have done the same to-day? Both the Amerieans and the Boers had been from childhood trained up in the use of the rifle and in scouting in their conflicts with wild beasts or with wilder men. The effects of sueh training when pitted against ordinary soldiers drill are well shown in De Wet's book, which contains some very useful, though to a Briton very unpleasant, reading. At Nicholson's Nek it is alleged that the English had the advantage of position and outnumbered the Boers by five to one. The battle lasted five hours; there were not more than two hundred Boers engaged, and their losses amounted to four killed and five wounded.

Amongst the English De Wet himself counted two hundred and three dead and wounded, and eight hundred and seventeen prisoners. The Boers also seized two Maxims and two mountain guns, a thousand rifles, and twenty cases of cartridges. In this engagement the losses of the English correspond to one man killed or wounded by every Boer, while the Boer losses are less than one killed or wounded to every hundred Englishmen, who were firing at them without intermission for five hours. Such a thing is almost incredible, and certainly if the English had been trained like the Boers it would have been absolutely impossible. Several similar instances might be taken from De Wet's book, and prove most conclusively the truth of what you say at the conclusion of your article: "Let every citizen realise that he has a personal duty to perform. At the very least it is his business to learn to shoot with a rifle and to help others to do the same."—I am, Sir, &c., LAUDER BRUNTON.

[Sir Lauder Brunton's support of the cause of "compulsory physical training of a military kind" for all boys is of the utmost value. If he and his colleagues among our leading medical men would only exert their influence and authority in regard to the hygienic aspects of the case, a great effect would be produced. His exposure of the hollowness of the parrot-cry of "militarism" is most useful.—ED. *Spectator*.]

NATIONAL HEALTH AND PHYSICAL EDUCATION.

To the Editors of THE LANCET.

SIRS,—The Scottish poet Burns has given expression to a most excellent prayer, and one suited to almost everybody, in the lines :

“ O wad some pow'r the giftie gie us
To see oursels as ithers see us.”

The fact that a large proportion of our urban population is unfit for military service has, I believe, been fully known to, and carefully considered by, our German friends for a considerable time while we have been more or less blind to it and have certainly not given to it the consideration it deserves.

It seems to me that Sir Frederick Maurice by his writings and speeches, and you by your leading article in THE LANCET of Jan. 31st, p. 315, have done public service by drawing attention to the fact. It is, indeed, staggering to learn that out of every five would-be soldiers only two are found to be fit for service after two years. It is probable that, as you say in your article, this condition is not that of the population at large but only of a certain section of it. The fact that the record is

constantly being broken for all sorts of feats of strength, agility, and endurance, such as lifting weights, high and long jumps, foot races, scores at cricket, bicycle rides, and swimming, indicates that the physique of the well-to-do classes is improving rather than deteriorating. But, on the other hand, the existence of a large section of the community, and that, too, the one which is most readily available for recruiting, having such a poor physique that only two out of every five are fit for military service is, as you most truly say in your leading article, an appalling fact. Nor is the condition a serious one only because it prevents us from getting the number of soldiers we need when an emergency arises, it is serious also from the civil standpoint, for if these men are unfit for military service what are they good for? Poor in physique as they all are, and poor in mental capacity and power of application as you suggest many of them are, What becomes of them? Many of them probably marry girls as weak as themselves and have children, some of whom go to swell the lists of infant mortality, some to join the criminal classes, while others grow up more weak and incompetent than their parents. It is probable that for the existence of this class the medical profession is to a considerable extent responsible. For by its increased knowledge and more energetic application of medicine and hygiene children are now reared who, under less favourable conditions, would have died in infancy. The harm which it has thus done the medical profession must now strive to undo by doing its best to secure that children shall not merely grow up, but shall be sufficiently strong and healthy to fit them for the battle of life. How this is to be done is a problem by no means easy to solve; in search for a solution, as Sir

Frederick Maurice truly says, one makes many mistakes and has often to change one's impressions, and therefore it is with the utmost diffidence and merely in a tentative way that I should like to mention some ideas which have occurred to me in regard to it. First of all, we want information as to (1) the causes of physical deficiency; (2) the best means of remedying the defects; and (3) the best means at present available in case that the best means possible cannot as yet be applied.

Information having been obtained on these points the next thing is its practical application. It is obvious that such tasks could only be undertaken by the Government and they ought properly to be undertaken by a board of health if such a board existed. In the absence of this much-needed board I suppose the best means of obtaining information would be the appointment of a small commission, regarding the composition of which the Royal Colleges of Physicians and Surgeons might fitly be consulted. As you truly say in your leading article: "No purpose can be served by attempting to answer a question of such a size as, What are the methods by which our national health can be improved?" But the scope of the inquiry might be limited to the three chief points insisted upon by Sir Frederick Maurice—namely, deficient teeth, flat-feet, and generally weak physique. The commission might ascertain to what extent decayed teeth are present at different ages among the children attending the Board schools throughout the kingdom. They might try to ascertain also how far the presence of decayed teeth coincides with the absence of phosphate of lime and silica in the food. If these substances be absent or deficient we can no more expect a child to have strong teeth than

*An interdepartmental Committee
on Physical Deterioration was
appointed*

we can expect a hen to lay eggs with well-formed shells when it is not supplied with lime in its food. The perfection of modern mills and the consequent separation of the outer part of the wheat and the mineral matter it contains from the starchy-matter which goes to form white bread is probably responsible to some extent for decayed teeth. Secondly, the occurrence of flat-foot at different ages should form part of the inquiry and along with this might go an examination of the development in the calves of the child's legs. Thirdly, they might seek to find out how far early marriages are due to youths and girls having nothing to do after their hours of labour are over excepting to walk about with one another, and if this be a cause how far its action might be prevented by providing such occupations and amusements as would not only fill up their leisure time but tend to develop them physically, mentally, and morally.

Until such information is obtained it is impossible to speak with certainty as to the best means of removing the physical deficiencies to which Sir Frederick Maurice has drawn attention. It seems to me probable, however, that though decay in teeth, like other nutritive phenomena, depends upon the condition of the body as a whole, especially of the nervous system, yet it may be greatly influenced by diet and cleanliness.

Of diet I have already spoken, but attention to cleanliness of the teeth is also of great importance. Caries is often started by acids formed by the decomposition of particles of food lying between the teeth. When the teeth are healthy and strong they may defy the attacks of such acids, but where they are weak they undergo erosion and begin to decay. During the day the teeth are kept more or less clean through being washed by the alkaline saliva

and rubbed by the tongue, but during the night particles of food may lie between them for many hours and decompose. The bad effects of this might be greatly lessened by children systematically cleaning their teeth, especially at night. The expense of tooth-brushes renders their employment out of the question by the poorer classes, but all that is required is a lucifer match which has already been used. One end of this is cut into a wedge shape and passed between the teeth, so as to press out any particles of food that may be lodging between them. It should also be drawn round the base of each tooth close to the gum so as to remove any adhering tartar. The expense of such treatment is *nil*, the trouble is very small, and the gain from it would be very considerable.

For flat-feet balancing exercises on the toes might be regularly given to school children, but they ought to form only a part of general physical training which should be as compulsory for every child as learning the "three R's." If, as I believe, early marriages are partly due to want of suitable occupation and amusement in leisure hours, this might partly be avoided as far as men are concerned by developing their interest in volunteering through regular training at school in the use of a rifle between the ages of seven and 14 years. Their interest might be kept up by rifle and pistol saloons in which they could learn to aim with precision both at stationary and moving objects. The success that has been obtained by Colonel Fox in the development of young recruits by physical exercises shows how extraordinary the benefit is which youths derive from such exercises, and if they were systematically employed in schools many of the recruits who are now rejected would probably be well over the mark of efficiency, while their training in the use of the rifle would

enable them to learn all the necessary drill much more quickly than at present and leave them with more spare time during their service. In regard to the employment of their spare time we might, I think, with advantage take a lesson from the Russian army, and upon this point Mr. Francis H. E. Palmer makes some remarks which are so apposite that, with your permission, I should like to quote them entire: "Military training has naturally produced the most striking results among the lower classes as it has served to develop the very faculties in which the peasantry are most deficient. The recruit drawn from the easy-going life of the village, where he seems incapable of doing anything except as a member of his artel, is suddenly transported into a new world in which many moral qualities that have hitherto lain dormant are called into play. Strict obedience is already a part of his very nature, but the necessity for order, exactitude, punctuality, and alertness is impressed upon him at every moment. A Russian peasant or workman upon the completion of his military service can nearly always command from 25 to 50 per cent. higher wages than those who have not had this advantage. It is not in moral training alone, however, that the lower classes have benefited by military service. Only a very small part of the multifarious requirements of the Russian army and navy could hitherto be supplied by private industry, and the Government has been compelled to convert itself into a colossal manufacturer and universal provider. Private industry has been fostered, it is true, whenever possible, but nevertheless the Government has been compelled in almost every branch to take the initiative from the weaving of cloth for the soldiers' uniforms to the making of common or scientific instruments.

In the army almost every trade is carried on and rarely does a recruit return home when his military service is over without having gained some technical knowledge that greatly increases the value of his labour.”¹

If the army were thus converted into a huge technical school and manufactory, in which all the uniforms, shoes, saddlery, &c., were made, the expense of maintaining the army would be so much lessened that we might hope for a marked diminution in taxation, whilst the men trained in it after their return to civil life would be able to support their wives and families instead of becoming a burden on the ratepayers.

I am, Sirs, yours faithfully,

LAUDER BRUNTON.

Feb. 10th, 1903.

¹ *Russian Life in Town and Country.* By Francis H. E. Palmer. London: George Newnes, Limited, 1901, p. 260.

NATIONAL DEFENCE AND PHYSICAL EDUCATION.

(Reprinted from *The Manchester Guardian*, April 2nd, 1903.)

TO THE EDITOR OF *The Manchester Guardian*.

SIR,—This nation is awakening to the necessity of an increase in our national defences to secure us against invasion and the necessity to physically educate our children and youth, in order to counteract the deterioration in our population which has attained such an extent as to constitute a national danger. I fear, however, there are very many in this country who do not appreciate its dangerous position, and I may therefore be pardoned for pointing out the risks to which we are exposed in a way so plain as to appear to some almost objectionable, for although we are beginning to recognise the unwelcome truth that the British are not beloved abroad we do so very unwillingly and reluctantly. We are conscious that, whatever a small minority may feel or say, the great bulk of the British people regard other nations with positive good-will or at least without animosity. We feel such a strong desire to live at peace with them that we can hardly conceive that they might wish to attack us. We do not realise that our liberty and freedom which we prize so highly, our riches, our commercial success, our command of the seas, and our extensive colonies are each and all a source of offence to those who do not possess them in the same measure as ourselves, and cause them to regard us with envy and dislike.

Moreover, rightly or wrongly, there is a wide-spread feeling abroad that our advantages have rendered us proud and disposed to look down on those who are less highly favoured than ourselves. The arrogance and contempt which they attribute to us they repay with hate, and nothing would give many of them greater pleasure than to destroy England's power and humble England's pride. In addition to this, our riches are a constant

temptation to their cupidity. What scheme could be more attractive to a nation, possessing a large army but in want of more money, than to seize an opportunity when a great part of our fleet has been lured away to some distant part of the world, declare war on some pretext which could easily be found, descend on our shores, seize London and our other seaports so as to gain possession of all the foodstuffs which had escaped capture by their cruisers, and thus quickly starve the country into submission? They might then demand as the price of its evacuation the complete surrender of our fleet, transports, and colonies, in addition to such an enormous sum of money as would impoverish Britain for many years to come and correspondingly enrich her conqueror.

What is to prevent such a programme as this from being carried out? There is undoubtedly the mutual jealousy of Continental Powers to whose disadvantage it might be that a neighbour should be so greatly enriched and strengthened as it would be by the conquest of Britain. But in the not impossible event of a coalition of France, Russia, and Germany against isolated Britain, the programme which none might carry out singly might be carried out by the combination. We sincerely trust that such a coalition may never take place, but nevertheless we must look the possibility of such an occurrence in the face and consider what the result of it would be. In such a crisis our colonies would almost certainly declare themselves independent. Canada would join the United States, and would be safe under the ægis of the Stars and Stripes; India would fall to Russia, Gibraltar and Egypt to France; whilst Germany might take South Africa, and by its huge armies, with the aid of the fleet and transports taken from us, might soon reduce it to subjection. Australia and New Zealand might share the same fate.

Should such a coalition occur, what defences have we to prevent all these evils from coming upon us? There is first our fleet, and there is a general consensus of opinion throughout the country that we must make it as strong as we can. But at the present time, when the comparative power of ironclads, torpedoes and submarines are still an unknown quantity, it would be madness to depend on our fleet alone, for a few torpedo accidents to

our ironclads or even some defects in their boilers might so seriously reduce our fleet as to render it insufficient for complete defence. Besides, ironclads take long to build, our risks are imminent, and in order to ward them off we must have men sufficient to meet and repulse any invaders who may land on our shores. As a correspondent to the *Times* has pointed out in an able article on "The Problem of the Army," we must rely on our auxiliary forces for the defence of the country, and surely every effort should be made to augment their strength and efficiency without delay. Every inducement should be given to enter the volunteers, and every facility should be provided for them to learn how to use their rifles. How much can be done by men who can shoot, though totally destitute of military training, was shown to our shame at Nieholson's Nek, where, according to De Wet's account, during an engagement lasting five hours, 200 Boers, fresh from their farms, overcame 1,000 trained English soldiers, killing or wounding 203 and taking 817 prisoners. They also seized two Maxims, two mountain guns, 1,000 rifles, and 20 cases of cartridges. Their own losses only amounted to four killed and five wounded.

In pleading for training in the use of the rifle in schools I am very far indeed from wishing anything like militarism in this country. I am certain that a very large proportion of peace-loving citizens like myself are very far indeed from desiring the growth of such a spirit, and are anxious that we should remain a nation of shopkeepers or farmers rather than become one of soldiers. At the same time we know that at school the small boy is liable to be attacked, however inoffensive he may be, while the boy who is able to thrash any of the others is left alone and may live in peace as much as he likes. His strength does not necessarily render him a bully, and a condition of being perfectly prepared to defend ourselves would not render us aggressive. And surely it is as much every citizen's duty to be able, in case of need, to defend himself, his family, and his country as that he should know the "Three R's." As someone has said, a fourth R should be added for "rifle," and a knowledge of how to use it should be as much a compulsory part of every boy's education at school as a knowledge of the three R's. The

readiest way of securing a sufficient number of men to defend our country would be to establish universal conscription, but so strong and widely spread throughout the country is the dislike to such a proceeding that even the perilous position in which we now are will hardly induce the nation to submit to it. Nor is it absolutely necessary, for probably all its advantages, without its disadvantages, may be gained in another way. If every boy in every school in the country began to receive a little drill at the age of seven, simple sticks or toy guns being used for rifles, and if more complete instruction with ample opportunities for shooting were given as the children grew older, all boys at the age of fourteen might be able to use a rifle much better than some of our present soldiers, and in case of need might prove, like some of the Boer youths in the late war, perfectly able to fight against trained soldiers. If such training had been universal in schools twenty or even ten years ago we should not have had to read with shame De Wet's recital of the defeat of our troops at Nicholson's Nek and elsewhere. In every village in the country the elder boys and youths should have instructors to show them how to take advantage of all the cover in their neighbourhood, and they might divide themselves into two bodies, one to represent the attacking force and the other the defenders of the village. By playing these parts alternately they would not only learn thoroughly how to utilise every advantage which the neighbourhood offered for defence, but would learn also the weak points most liable to attack, and therefore requiring extra care to guard. Neighbouring villages should be instructed how to co-operate, and these should be united into larger districts, so that in the event of an invasion our defenders would not form an undisciplined mob, but a body of trained marksmen each one of whom would know what to do as thoroughly as a sailor on board an Atlantic liner knows his place and duties at fire drill.

Such training would not foster an aggressive spirit or spoil men for peaceful pursuits any more than our present system of volunteering, and it would have the further advantage that, being begun at an early age, the physical exercises which should form part of the drill would assist the development of the

children's bodies; whilst the habits of prompt obedience and of decision which they would learn would be a most useful preparation for the duties of civil life. But training and exercise are not all. We must attend to the health of the children and youths. Sir Frederick Maurice recently pointed out that out of every five recruits only two proved themselves fit for service after two years. This estimate of unfitness, appalling as it is, appears to include all recruits, from the country as well as from town, and is far too low for towns or urban districts, for in a speech at Lancaster, on February 11th, Sir John Gorst stated that out of 11,000 men offering themselves yearly in Lancashire for enlistment only 1,000 were fit.

Under such circumstances there is urgent need of a Royal Commission to inquire into the causes of this unfitness and to recommend measures for its removal. Possibly, amongst other things, it may be necessary not only to give the children regular physical exercises, but to give some of them one free meal daily in order to fit them for these exercises, as well as for learning the three R's. All these things will cost money, and most of us already grudge the heavy taxes we now pay; but we must regard the additional taxation required for efficient national defence as an insurance premium against invasion and against the enormous taxes which we should begrudge a thousand-fold more and yet be forced to pay in the event of a foreign army invading our country and starving us into submission.—I am,
&c.,

LAUDER BRUNTON.

March 31st, 1903.



. . NATIONAL PHYSICAL TRAINING.

AN OPEN DEBATE.

(Reprinted from *The Manchester Guardian*, Tuesday, June 2nd, 1903.)

By SIR LAUDER BRUNTON, M.D., F.R.S.

THE advantages of physical training are fully recognised, perhaps even over-estimated, in our public schools, and the English public is beginning to awake to the necessity of extending to the children of the poor the advantage of this training which is now enjoyed by the children of the rich. The Royal Commission on Physical Training for Scotland, in its recently-issued report, recommends that systematic physical drill should be an integral part of the school curriculum, and that due encouragement of sports and games is equally important with it for the development of a healthy body. Mr. John Burns is quite right in thinking that physical training will not do everything to restore the deteriorated physique of the nation. As he very truly says, "The fathers must drink less alcohol and the mothers less tea," and the food and surroundings of the child must be improved from birth onwards. But the boys and girls who are now at school will be the fathers and mothers of the next generation, and if by physical training we can increase their strength they will not have the same craving for alcohol and tea, and they will have more inclination for exercise. They will be able to earn better wages and they will be able to give their children better food than they have had themselves; and in two or three generations we may hope to find the standard of English physique again rising to its proper height. It is of the utmost importance that physical training in schools should be of the proper kind and carefully adapted to the varying wants of growing children at different ages. Physical exercise does not of itself impart strength; it only stimulates the various organs of the body to grow larger

and stronger, but if overdone it has just the contrary action and produces weakness instead of strength. A most instructive lesson is taught us by the observations of a Russian physiologist, Professor Pavloff, who finds that there is no stimulus to digestion so good as appetite. If the food be appetising the digestive juices are poured out in quantity and digestion goes on with the greatest ease. If the food is not appetising, even though it should be in itself digestible, it does not excite secretion of the gastric juice, and so the food is digested with difficulty. In the same way it is of the utmost importance that the great majority of exercises for physical training should excite interest and pleasure in the children, or their effect will not be so satisfactory. Dreary, unpleasant exercise will not only be apt to fail in increasing the child's strength, but is apt to create a dislike for this exercise in particular and for exercise in general, so that the child will only take it when it is forced to do so, instead of employing its spare time in practising those exercises and games which will give it both pleasure and health. All young animals incline to be sportive and fond of exercise, but their movements are different from those of grown-up animals. They are abrupt, erratic, and constantly varied, but as the animals grow up their movements become more steady, persistent, and long-continued. In physical training this should be constantly borne in mind, and the movements or exercises adapted to the age of the child. The animal body is very complex, and physical training ought to be adapted to develop all its parts—the muscles, by which movements are effected; the nerve centres, which co-ordinate the muscles and make them act harmoniously together; the brain, which directs them what to do; the heart, which supplies them with blood; the lungs, which keep the blood aerated; and the digestive system, which supplies the material to repair waste and to maintain growth. Slow exercises requiring a certain tension of the muscles, such as posturing, dumbbells, Indian clubs, and the use of elastic cords tend to increase the strength of the muscles. All kinds of play with throwing and catching balls increase the co-ordination by which eye, body, and limbs work together, while running tends to develop the lungs and heart. The directing power of the

brain is increased by drill, which teaches the children to go through movements at the word of command. The best system of physical education is that which will meet all the necessities of the various organs of the body. Exercises in gymnasia are imperfect, because they tend to develop chiefly the muscles and only to a lesser degree the co-ordinating centres, so that a boy who may be able to perform feats of strength in the gymnasium may be quite unable to catch a ball in the playground. For any thorough system of physical training a playground is essentially necessary, and training should as far as possible be carried out in the open air. In the admirable report already mentioned, the Royal Commission recommends that the wants of an increasing school population should be met, not by additional school-rooms, but by playgrounds, gymnasia, and recreation halls; the hours of study should be shortened, and by a system of relays children should exchange the schoolroom for the recreation-room or playground during a very large part of at least their earlier school life.

The most thorough system of physical education appears to me to be the Swiss, which includes not only exercise and drill, but also games. In the Swiss as well as the Swedish system the muscles are trained by position exercises either with or without light weights, and the brain by drill. Co-ordinating nerve centres are trained by games of ball, and the heart and lungs are developed by running. The attention required to act at once at the word of command in drill involves, at first at least, a considerable amount of nervous strain, and is to be reckoned as mental rather than as bodily exercise. It is very useful in training to habits of prompt obedience and of combined action, but like other lessons is apt to be wearisome to the child, and should not be continued long at a time. Drill with music makes less demand upon the attention and may be continued longer, and takes a half-way place between work and play. The great delight that children naturally take in "playing soldiers" may be utilised, and the pleasure they may thus obtain ought not to be prevented by any foolish fear of "militarism." The games recommended by the Swiss rules are of the same kind as those which are popular with us—tig, cross-tig, leap-frog, hide-and-

seek, and games of ball. These games are carried out in the open air, and as many players as possible take part in them. According to the rules of the game, no scholar is to be idle, and the masters watch the games as much as the exercises in order to see the effect of them upon the scholars and to prevent those who are weakly being injured from overstrain. It is especially in games involving severe or long-continued strain that injury is apt to take place, but even the slight exercise of posturing or drill makes an extra demand upon the child's powers and creates a need for more food. When children are badly fed, physical training, even of the right kind, may do harm rather than good. A good many years ago the nation decided that it could not afford to have its citizens ignorant, and if the parents could not pay for the children's education the State must supply the funds to do it. The nation can as little afford to have its citizens decrepit as ignorant, and if parents cannot supply the food necessary to enable their children to benefit by physical training it appears to me only logical to demand that they shall have the necessary food supplied to them gratuitously. But this should only be done when it is absolutely necessary, and, as the Royal Commission points out, the desired object may be in many cases attained by the parents paying a small fee, for which the school might supply a meal more wholesome, more nutritious, and—what is very important—more appetising than could be provided at the same cost at home.

A NATIONAL LEAGUE FOR PHYSICAL EDUCATION.

To the Editors of THE LANCET.

SIRS,—In consequence of your leading article in THE LANCET of Jan. 31st, p. 315, I wrote you a letter which appeared in your issue of Feb. 14th, p. 471. In this letter I ventured to suggest the appointment, with the advice of the Royal Colleges of Physicians and Surgeons, of a Royal Commission to inquire into the causes of the physical deterioration of the people of this country as shown by recruiting statistics. There seems to be good hope that such a commission will be appointed and that trustworthy information may be obtained regarding the three points especially insisted upon by Sir Frederick Maurice—viz., bad teeth, flat feet, and generally weak physique. But even supposing that all the necessary information has been obtained and that legislation has made physical training as compulsory as mental education in schools the desired end will still not be attained. Nor will it even be sufficient to provide good meals at a cheap rate, or in some cases gratis, in schools so that children insufficiently fed at home may be sufficiently fed at school to enable them to take advantage of the physical and mental training provided there. As Mr. John Burns very truly said in the *Manchester Guardian* of April 27th, "The father must drink less alcohol and the mother less tea, take more exercise, and suckle her children." The mother must also know how to

feed her children after they have passed their infancy and both fathers and mothers must learn the value of fresh air. They require instruction as much as the children but of a different kind. It is of no use to tell them not to drink so much beer, spirits, or tea unless the craving for these stimulants is removed by enabling them to get proper food which shall not only be nutritious but appetising. We must look to the establishment of cheap eating-houses and coffee-taverns and extended instruction in cookery as the chief agents to which we must trust for the diminution of drinking customs and to the instruction of mothers in the feeding and hygiene of children for the reduction of infant mortality. A great many agencies are already working for the advancement of physical education and health in this country, but for the most part each body works in an isolated manner and loses the advantages which might be derived from coöperation and coördination. The advantage of combined work has been so strongly felt by some of those interested in the subject that more than a year ago we drew up a draft scheme for a national league to promote physical development, but the sudden death of the late Lord Frankfort, the pressure of other duties upon others, and my own severe illness, lasting nearly a year, have prevented further action from being taken in the matter. The present moment seems to be suitable for bringing this scheme forward and for endeavouring to develop a "health conscience" in this country by the combined efforts not of a few medical bodies, as proposed by Dr. T. S. Clouston in his admirable address, but by every sort of agency, individual as well as corporate. In the draft scheme which we had drawn up it was proposed that someone in high position might be invited to become president and that vice-presidents might be found amongst the members

of both Houses of Legislature, whilst the clergy, the law, the medical profession, the press, both medical and lay, as well as educational institutions of all kinds, might be incorporated and united in working towards one common end. Such an association might be called a National League for Physical Education or, shortly, a Physical Education League, and by the combined action of the various individuals and bodies who would compose it much greater results might be obtained than could possibly be expected from their isolated action.

I am, Sirs, yours faithfully,

LAUDER BRUNTON.

July 14th, 1903.

A "HEALTH CONSCIENCE" AND A NATIONAL LEAGUE FOR PHYSICAL EDUCATION.

To the Editor of the "British Medical Journal."

SIR,—The proposal to develop a "health conscience" in this country so admirably made by Dr. Clouston in his address printed in the BRITISH MEDICAL JOURNAL of July 11th, is one with which every well-wisher to his country must sympathize. But the difficulties in the way are so many and the inertia to be overcome is so great that a more extended organization than that which he has proposed seems to be required, although the three medical corporations which he mentions might most usefully form a part of it.

The advantages to be obtained from combined work have been so strongly felt by some of those interested in the subject of physical education, that more than a year ago we drew up a draft scheme for its promotion, but the sudden death of Lord Frankfort, pressing duties on the part of others and my own severe illness, lasting nearly a year, have prevented further action from being taken in the matter.

The present seems a suitable time for bringing this scheme forward. In the draft which we had drawn up it was proposed that some one of high position should be invited to become president, and that vice-presidents might be found amongst the members of both Houses of Legislature, whilst the clergy, the law, the medical profession, the press both medical and lay, as well as educational institutions of all kinds, might be induced to work together for one common end. Such an institution might be called a National League for Physical Education, or shortly a Physical Education League, and by bringing about the co-operation of the medical profession with other bodies might effect all that Dr. Clouston desires, and even more, for it might ensure that the dictates of a national "health conscience" should be carried into effect.—I am, etc.,

Stratford Place, W., July 14th.

LAUDER BRUNTON.

NATIONAL PHYSICAL EDUCATION.

Account of the meeting at which the proposal to form a National League for Physical Education and Improvement first took a definite shape.

By J. B. ATKINS, London Editor of *The Manchester Guardian*.

(Reprinted from *The Manchester Guardian*, Thursday, July 23rd, 1903.)

A PROPOSED LEAGUE.

THERE was never a time, probably, when the physical improvement of the people was a more red-hot subject than it is now. Until the last few months the matter was discussed by a few experts, mostly with a professional interest in it, who (with a few notable exceptions) frightened ordinary people away. The public avoids deserts, particularly deserts of figures. But at last the subject has become fit for human consumption, and one hears it discussed by persons whose interests are the current interests of the majority. A dinner which was given on Tuesday* night by a distinguished London physician at the Athenæum Club was a sign of the times. True the guests were nearly all experts, but they spoke with the pleasant consciousness of the great feeling which is at last pushing them on from behind. After the dinner, at which I had the pleasure of being present, the Bishop of Ripon spoke. And here I must mention an original plan of our host which is worthy of commendation and imitation. Before each guest paper and pencil were placed. Why? The reason grew on us slowly. At first we saw no particular reason for the paper and pencil, and left them alone. We wanted to do nothing but listen to the Bishop of Ripon, one of the half-dozen most accomplished speakers of the English language in the world. But before long the pencils were taken up to capture a fugitive thought or phrase for future reference. Thereupon the plan

* This is a misprint, the date was Monday, July 20th.—[L. B.]

had unconsciously begun to work. When a few notes had been made in this way the skeleton of a speech lay before everyone, and not to deliver it was to suffer from that acute disease which is epidemic in the House of Commons—"suppressed speech." Before the evening was over almost everyone had said something. For nearly three hours the discussion went on, at times two or three persons trying to talk at once, and when the end came the subject was left unwillingly. This surely was a triumph. And the opinions of such men as the Bishop, Lord Grey, Lord Glenesk, Sir Henry Craik (the president of the recent Scottish Commission on Physical Education), Sir Frederick Maurice, Mr. Maxse, and Professor Clifford Allbutt were worth hearing.

The Bishop dealt chiefly with the alleged decline of the birth-rate all over the Empire. He did not say it was proved; he said it was a proper and urgent subject for inquiry. Is the decline a sign of greater thrift and prudence? Is it due to the postponement of marriage? If so, he argued, there is nothing to say. But is it not possible that sterility increases with civilisation? If so, we face the fact that in this Imperial age the races which Imperialism wishes to see grow are dwindling or are stationary, while the very races which Imperialism wishes to see dwindle are increasing. As for our physique, the Bishop spoke chiefly of the rush to the towns, certainly a contributory cause to deterioration which has the advantage of impressing itself at once on the popular fancy. Another speaker hoped to see the conveyance of power by electricity make it possible to scatter our factories—the interesting view of the wholesome optimist which that speaker often declares himself to be. But he was prepared to go any lengths to repopulate the country, even the length of abandoning Free Trade, which he professed to cherish. Soon the discussion settled on food, and there was a point made here which did not appear in your recent articles on physical training—namely, that proper feeding is not merely the necessary precedent to proper physical exercise, but that physical exercise is the necessary precedent to the proper assimilation of food in the body. The cost of milk-feeding was a subject on which there

was astonishing disagreement. If the price named by one speaker was right, we find ourselves against a blank wall at once, for it is quite prohibitive for all but fairly well-to-do people. In any case the remark was disputed by no one "that it is a terrible and ironical reflection that a boy sent for misconduct to an industrial home has a far better chance of being brought up physically well than the boy of a poor but proud and respectable father." The comparison—uttered quite simply, without ironical intention—between our own slum children and "good healthy children from Poland" (observe, all who are interested one way or the other in alien immigration !) was rather a stinger. The end of the whole discussion was that we took away in our pockets for consideration a printed draft scheme for the formation of a National League for Physical Education. This scheme was hardly discussed at all, and is intended only as a starting-point for thought. The only point made—and it was clearly a just one—was that the nourishment of young children is primarily a woman's question. Therefore on the proposed council there ought to be at least as many women as men. The following is the scheme:—

PROPOSED NATIONAL LEAGUE FOR PHYSICAL EDUCATION.

DRAFT SCHEME FOR CONSIDERATION.

The objects of the proposed league are—

1. To co-ordinate the various agencies which are at present working independently of each other for the advancement of physical training.
2. To supply the information and assistance required to complete the work.

For these purposes it is proposed to unite all the bodies and individuals interested in the subject as members of one league, with an executive body consisting of president, vice-president, and council.

It has been suggested that possibly H.R.H. the Prince of

Wales, who has shown great interest in physical training, might become president.

Vice-presidents might be found amongst the members of both Houses of Legislature and others interested in the subject.

Several names were suggested :—

in the House of Lords :

in the House of Commons :

in the Law :

in the Education Department :

in the Medical Profession : and

in the Press : Editors of chief journals.

[In the original draft scheme a number of names were given, but they were not intended for publication, and appeared in *The Manchester Guardian* by mistake and without the consent of those named. They have therefore been omitted in this reprint.—L. B.]

Council: This must necessarily be very large, and out of it an executive council may be chosen. It should include clergymen, mayors of towns, chairmen of county councils, heads of schools of all sorts, town or country gymnasia, secretaries of cricket clubs, football clubs, cadet corps, boys' brigades, Church Brigade, lads' drill associations, rifle clubs, girls' clubs, lecture associations, temperance associations, and, last but not least, all editors of papers of every shade of political opinion, religious papers, papers for children, for boys, and for girls, and writers of books for children and youth.

SUGGESTIONS FOR CONSIDERATION.

I.—A. Before the various bodies or individuals who are trying independently to promote physical education can work together each must know what the others are doing.

1. A list should therefore be prepared of all these bodies, giving very shortly their names, localities, numbers, kind of action, and names of secretaries.

2. A monthly or weekly paper should be started to give information regarding appointments or changes, and form a

means of communication. It might be called the "Physical Education News."

3. A larger publication might possibly be advantageous for longer papers on important topics. This might appear quarterly or monthly, and be called the "Physical Education Review."

B. The co-ordination of the various bodies might be of two kinds, (1) generic, and (2) territorial.

1. All bodies of the same kind, schools, continuation classes, gymnasia, cadets, and volunteers, might learn from the "News" what others engaged in the same pursuits were doing, so that any improvement made by one body could be adopted by others and arrangements made for occasional meetings or contests.

2. The different bodies in each district, *i.e.*, the schools, young men's associations, schools for cookery and housework, girls' clubs, rifle clubs, volunteers, &c., might learn to work together and to co-operate with those of adjacent districts.

II.—The information wanted to complete the work may be obtained partly by voluntary effort, but more easily by Royal Commissions on the Housing of the Poor, on Intemperance, on the Hours of Labour amongst Children. Some of these have already reported, and that which is now proposed on the Causes of Physical Deterioration generally may report especially in reference to the hours of work in schools, the accommodation for play, the time for play, and the physical training of children, not only by exercises but by games to develop their bodies, along with a certain proportion of drill to increase their powers of attention and prompt action. The assistance needed would require to be of many kinds, *e.g.*—

To have the law so altered that the children should have shorter hours of work, and that their work should not be continuously mental. Every hour of study should be shortened to 45 minutes, which I believe to be the rule in Germany, or 40 minutes, which I believe to be the rule in Sweden. During this 15 or 20 minutes in each hour the windows might be thrown open and the room ventilated while the children play or have exercises, or have drill outside.

To provide playgrounds and playrooms under cover for the children.

To provide the necessary instructors for physical exercises.

It might be requisite to provide meals at school at a low charge, and in some instances free, in order that children underfed at home might be able to do their lessons or exercises, or even to play properly.

The provision of cheap meals at schools would also be useful as affording larger opportunities for teaching cooking to the girls attending school than they could possibly have if no such meals were provided.

In cases where the mothers cooked badly the children might be allowed to buy food at school, for the purpose of taking home, at such a price as would fully remunerate the school and yet be cheaper for the mother than what she could prepare at home.

Classes for cookery amongst mothers might also be held, but in any case the girls at school, who will be the mothers of the next generation, will learn to cook.

Instruction should be given to all children, and especially to girls, regarding the nature and digestibility of foods and the general laws of hygiene, in relation especially to fresh air, clothing, abuse of stimulants (tea or alcohol), and avoidance of infection.

Provision requires to be made for places where girls and lads who have left school and are employed during the greater part of the day in various trades may spend their spare time with enjoyment and profit to themselves instead of wandering round the streets and getting into mischief.

For this purpose girls' clubs and boys' drill halls appear to be useful, but their use requires to be greatly extended. If proper arrangements were made for this purpose, the numerous premature marriages, which tend to increase a weakly population, might be lessened, and the infant mortality would be diminished by the greater ability of the mother to suckle her infant, and her increased knowledge of how to feed it afterwards.

It is obvious to carry out the various schemes already mentioned, as well as many others connected with physical

education, a great deal may be done by Royal Commissions and Acts of Parliament, but it is almost impossible that they can do it all, and in order to obtain physical improvement in all classes to the desired extent, all classes in the nation must co-operate, and for this reason it is desirable to form a National Physical Education League.—[LAUDER BRUNTON.]

J. B. A.

PHYSICAL TEACHING.

LETTER TO THE EDITOR OF THE *British Medical Journal*.

(Reprinted from the *British Medical Journal*, Nov. 26, 1904.)

SIR,—In the *British Medical Journal* of November 19th, p. 1428, there appears a notice of a meeting to consider the advisability of founding a central institute for physical education in London,* and at page 1422 some editorial remarks of a somewhat caustic nature upon this meeting.† The notice is rather too brief to convey to the readers of the *Journal* a complete idea of what the object of the meeting was, and I therefore should like to explain it as briefly as possible. The motion was to found a central institute in London on the same lines as that in Stockholm, but with very considerable limitations. As I pointed out in seconding the proposal, the Central Institute in Stockholm has two distinct functions: (1) that of teaching physical education; and (2) that of granting certificates of fitness. These two functions are combined in the Stockholm Institute, just as they are in the case of medicine in the University of Edinburgh, but they may be perfectly distinct, as they are in the case of the University of London and its affiliated schools. In the event of the establishment of a school for physical training in London it would be better that it should remain separate from an institute which would grant certificates, and that London and provincial schools should equally be affiliated to such an institute, which should hold examinations and grant certificates to scholars from any school recognized by it on the same plan as that followed by the University of London. As there are a number of excellent schools for physical education already in the neighbourhood of London and in large provincial towns, it would obviously be unfair to them that any new school

* A conference held on November 23rd, 1904, at the offices of the London Education Committee, Victoria Embankment. The Bishop of Bristol presided, and the subject was introduced by Miss Theodora Johnson, Principal of the Swedish Institute, Clifton, Bristol.

† "The Tragi-Comedy of Physical Degeneration."

HARRISON AND SONS,
PRINTERS IN ORDINARY TO HIS MAJESTY,
ST. MARTIN'S LANE, LONDON, W.C.

ADDRESS

TO THE

NATIONAL FEDERATION OF HEAD TEACHERS'
ASSOCIATIONS AT CAMBRIDGE,

On January 5th, 1905.

A NATIONAL LEAGUE FOR PHYSICAL EDUCATION AND IMPROVEMENT.

BY

SIR LAUDER BRUNTON, LL.D., M.D., D.Sc., F.R.S.

(Consulting Physician to St. Bartholomew's Hospital, London.)

MR. PRESIDENT, LADIES AND GENTLEMEN,

I feel it is a very great honour and privilege to be allowed to address this assembly on the subject of a National League for Physical Education and Improvement. I feel that this subject is one of the utmost importance, one, I may say, of vital necessity to the welfare, nay, even to the very existence, of our country and Empire, and there is no class able to do so much to forward this scheme as school teachers. I think most of us are very far from approving the objects and methods employed by the Jesuits, but none of us can deny the wisdom they have shown in leaving adults alone and turning their attention to the children. The children of the present are the grown-up men and women of ten or twenty years hence, and later on they will become the elders of the people, and in their hands will lie the conduct of the country for good or for evil. "Train up a child in the way he should go," said the wise man, thousands of years ago, "and when he is old he will not depart from it." In your hands lies the training of the coming generation, and this training ought to be of a threefold character—mental, physical, and

moral. Some years ago the country awoke to the necessity of having mental training for every one of its citizens, and the Government insisted upon universal and compulsory education. Into your hands boys and girls of the rising generation are put, and you are required to teach them at least the rudiments of learning. But in making this demand upon you it seems to me that in many cases the Government of Great Britain has been imitating the conduct of Pharaoh of old, who demanded that his subjects should make brieks without straw, and you are required to turn out boys and girls up to a certain standard of learning when their feeble bodies and impoverished brains are incapable of assimilating the knowledge you impart. But how is this difficulty to be amended ; how are the children to become stronger and better in body and mind so that they may learn ? Here, again, when we try to answer this question we come back to the teachers. As shown by the report of the Inter-Departmental Committee on Physical Deterioration, three of the most potent factors for evil are (1) over-crowding, (2) alcoholism, and (3) insufficient or imperfect food ; and it is in your hands, ladies and gentlemen, that the remedies for these evils in very great measure lie. The conditions of overcrowding may no doubt be lessened by legislative measures, but, as the report says, "the permanent difficulties that attach to the problem reside in the character of the people themselves, their feebleness and incompetence, their reluctance to move, their incapability of learning, and in the obstacle this presents to the best directed efforts on the part of the local authority to employ their powers." It is almost hopeless to deal with grown up people who present these qualities. You cannot remake them, and one's great hope lies in the next generation, in teaching the children while at school the benefits of fresh air, the necessity for ventilation, and the advantages of exercise

MIGRATION FROM THE COUNTRY.

The overcrowding is partly, at least, consequent upon the great immigration from the country into towns. This is so great that, as the report says, "for every person who in 1851

lived in a town there are three at the present time." (Paragraph 80.) Although the health of towns has been greatly improved, the continuance of such immigration as this cannot but greatly increase overcrowding and its attendant evils. How, then, are we to lessen the urbanisation of the people and prevent immigration into the towns, or even, perhaps, bring some of the people back from the town into the country? In trying to answer such a question I think the easiest way is always to find out first of all why people leave the country for the town. The general inducements are, I believe, the hope of increased comfort in life, of easier or pleasanter work, of higher wages, of more comfortable surroundings, and of more amusement. There can be no doubt that there is a good deal of discomfort connected with farm work, especially in winter, when the labourers have to rise in the dark and cold, to go out whatever the weather may be, and not get back to their homes until it is dark again. When they do get home after a day of cold, wet, and discomfort, their homes leave often much to be desired. Their houses are often not only small, but in bad repair and uncomfortable; the evening meal is not only of poor quality but badly cooked; and instead of being able, like their town brethren, to go into a well-lighted, well-warmed and comfortable reading-room like that of a public library, where they can see newspapers, periodicals, and books, or where they can have lectures which amuse and interest them, or talks with their neighbours on all sorts of subjects, there is nothing for them to do but either stay at home in their poor cottages or congregate in a public house. Such is the comparison which the country cottager draws between his own lot and that of a town workman, and he is naturally induced to leave the country. His expectations may not all be fulfilled. He may find when he gets to town that the hours of work are just as long as in the country, that the work may be just as hard, that the accommodation in town is no better, and that the only difference in his amusement is that instead of going every night to the public house he may get an occasional variety by going to the music hall or cheap theatre.

RETAIN IN THE COUNTRY.

The way to retain people in the country is to make life pleasanter for them, and this is to be done first of all by improving their comforts at home, and although the building and maintenance of cottages must be the duty of the landlord, yet the comfort depends more on the teachers of the rising generation than on anyone else. For here again it is the teachers who will be able to instruct the girls in their schools in all the details of home management, in the little niceties that with little or no added expense convert a hovel into a decent-looking cottage, and especially in the art of cooking from poor and cheap material such dishes as will produce a most pleasant and appetising meal. In this respect we have a great deal to learn from the French, who are, perhaps, the most economical people in Europe, and who, with a bit of tough meat which in this country would hardly be reckoned fit for eaters' meat, with a few scraps of bread and the vegetables from their own garden, can produce a meal such as an epicure would be glad to sit down at. Nor must we despise the appetising nature of food and consider only its nutritive qualities, for the Russian physiologist Pavloff, to whom the Nobel prize for the most important discoveries in physiology has this year been awarded, has found that appetising food not only makes the mouth water, *i.e.*, increases the quantity of saliva in the mouth, but it increases also the secretion of all the digestive glands and thus renders food that is appetising much more easily digested, while food better in itself, but not so attractive to the palate, is digested with difficulty. Our country people, as a rule, are not only ignorant of how to cook, but they do not know how to make the best of the small patch of garden ground that is attached to their country cottage. Here, again, we must fall back on the aid of the teacher, who will be able to tell them what vegetables they need most, which will give them the best return, what are the best varieties to choose, when these should be planted, and who will make them do it and show them what kind of care these need. Nor is it with the vegetables that his

instruction will stop. He may tell them also about the flowers they are to plant so as to ornament their cottage homes, and not only this, but he may show them the marvels of beauty that are to be found in the plants and flowers by the wayside, in the meadows and coppices, and on the banks of the streams. He may show them, in fact, all the wonders of country life, which, when properly seen, make the country so attractive. When I was a boy the lesson in one of my school books was the story of "Eyes and No Eyes." Two boys who had taken a walk on the same day and over the same ground described their experiences afterwards to their teacher. No Eyes had seen nothing attractive, and was simply glad to get over the distance, whilst Eyes had seen at every turn something to interest and charm him. Courses of such training are now being instituted, and we trust that they may become universal, for the teaching of children to use their eyes will also teach them to use their brains and lead them into new fields of knowledge as well as add to the enjoyment of every hour of their daily life. Such a training will do a good deal to lessen the monotony of work in the country, and will supply a certain amount of amusement during the day. A good deal more may probably be done by having for every village or hamlet some large room where the inhabitants may meet, and where they may have light and warmth, books and papers, non-intoxicating refreshments and occasional addresses, sometimes illustrated, perhaps, by magic lantern slides to supply them with the amusement for which they crave, and which is one of the inducements to make them migrate to the towns instead of staying in the country. And here, again, it is to the teacher that we must look for help, for where in country villages is there to be found a room which would accommodate the people except the schoolroom? Fifty years ago the parish schoolroom in Scotland was also the parish library, and a very good library it was; and I think it is not too much to look forward to the time when, in the absence of a village hall, the schoolroom may perform the useful function of helping the grown-ups as well as the children. But here, again, we must turn to the teacher. Many of the grown-ups at present would not care for a library, would not care much for addresses, and

would greatly prefer a pot of beer and a pipe to any magic lantern pictures that might be shown to them. It is to the coming generation that we must look for the men and women who will prefer the higher pleasures, and it is upon the teachers of the present that we depend to train them up to do so.

EFFECTS OF ALCOHOL.

The second great factor in deterioration is alcohol, and if the use of alcohol could be brought within proper limits, even if not entirely abolished, the benefit to the nation would be incalculable. But here, again, let us ask why people drink. Many, many years ago, in a temperance periodical called "The Adviser," I read the story of an old drunkard, who complained "the neighbours always speak of my drinking, but they never speak of my thirst." It is the craving for alcohol that drives men to take it, and this craving may be either mental or bodily, or a combination of both. Solomon was the first to describe the action of alcohol, and to point out that it was an anæsthetic both to the body and the mind. It is an anæsthetic to the body just as chloroform and ether are, although it must be taken in larger quantity than they, and a man falling under its influence does not feel the pain of physical injury. Solomon makes the drunkard say, "They beat me and I felt it not, I will seek it yet again," and the same author describes the mental anæsthetic effect in language that I cannot improve upon when he says, "Give wine to him that is of a heavy heart, and strong drink to him that is ready to perish, that he may drink and forget his misery." It is this anæsthetic action which renders a man oblivious for the time being to the cares that weigh upon him, the bills that are unpaid, the discomforts of home, the drudgery of his work, and the thousand and one ills of this life, and makes him rejoice for the time being in a condition which is to him a paradise, even although it be a fool's paradise, and although his enjoyment is to be followed by greater misery than before. It is to the teacher again that we must look to instruct the children in the evil effects of alcohol on the body, mind and estate. This is already done in France and Switzer-

land, where the effects of alcohol are not only shown to the pupils by large wall pictures of men drunk and broken down, but also by pictures and models of the liver and other organs which have been destroyed by alcoholic excess. Smoking, too—though in moderation it is not injurious, and, I believe, is very beneficial to grown-up people—is not good for growing children, and the disadvantages of it may well be pointed out by the teachers.

PERSONAL HYGIENE.

For instruction in other subjects of personal hygiene, too, we must look to the teacher. He must instruct the pupils that health to a poor man is more than money at the bank is to the rich, for upon it depends his livelihood as well as his happiness. He will instruct them in the care of the teeth, and how a worn-out lucifer match used as a toothpick at night may perhaps prevent many a toothache, and that by the avoidance of spitting and by taking very simple precautions the dreaded disease consumption may in the course of one generation be stamped out and become as rare in this country as leprosy is now. I was much struck by learning that in one of the small rock villages in the Riviera, perched on a high cliff, miles away from any other village, where the whole population probably did not exceed 200 souls, the schoolroom was provided with a large wall picture showing the tubercle bacillus and the ravages it works, so that the children may learn from their earliest years how this dreadful disease is propagated and how it may be stamped out. But in all such diseases as consumption two things are necessary for their development, viz., the seed and the soil, and however abundant the seeds of evil may be, the disease will not grow if the soil be unpropitious. As a writer in a medical journal very neatly pointed out, one of the best ways of illustrating the effect of disease germs is afforded by the parable of the sower and the seed, where some fall upon good ground, grow up and flourish as a crop of disease, while others fall upon hard ground and perish. In consumption hospitals, although the germs were no doubt freely enough distributed in the years that are gone, the nurses, who were

healthy people, hardly ever took the disease. Thus if we can increase the healthy development of our children they will not only be more fit for work of all kinds, but they will be more resistant to disease. Now, one of the greatest needs of a child is sleep. It is during sleep that nutrition and growth take place, and the younger the child the more sleep does it need as a rule. We sometimes speak of the unsleeping heart, but this is a total mistake. The heart of the adult sleeps 13 hours out of the 24, but the heart of the child probably does not sleep so much, at any rate during its waking hours; and therefore there is all the more need for the quiet hours of rest and unconsciousness in bed for the heart as well as the brain and the other organs of the child's body. It is, perhaps, difficult for the teacher to help in this matter directly, but perhaps this, as well as other conditions of health and other points bearing upon the development of the child upon the health of the house and allied questions might be brought home to the parents by having what was described at the International Congress for School Hygiene in Nuremberg last April, as "parents' afternoons or evenings," in which the parents of the children attending school assembled in the school house and could be told about the children's health and progress and how to help them on.

PHYSICAL TRAINING.

Another most powerful agency for helping development is physical training, which forms the proper complement to mental training, and this training ought to be threefold. It ought to develop (1) the muscles by which movements are executed: (2) the nerve centres in the cord and cerebral ganglia by which the movements are co-ordinated; and (3) the brain by which all the movements receive a purposive direction. For developing the muscles simple movements, such as those with light dumb-bells, wands, Indian clubs, and free gymnastic exercises are useful, and such movements also develop, although only to a slight extent, the power of co-ordinating the muscles together. But for higher co-ordination I doubt if there is anything so good as games of ball of all sort. We find from the paintings

on the tombs of the ancient Egyptians that such games were a favourite pastime with them, and I believe that all through the world's history games of ball have held a very high place as amongst the best for developing co-ordination. The chief difficulty about them is the space that is wanted. For example, a game of cricket is undoubtedly one of the very best means for developing co-ordination that could possibly be devised, but the space required to play it is very great in proportion to the number of players engaged. This renders it impossible to provide cricket for all the scholars at a school, at least in towns. I am, however, informed by Mr. C. B. Fry, the well-known athlete, that it is possible to gain almost all the advantages of cricket from games of ball played within a limited space, and such may very properly be introduced in all schools, even in town schools. There is no doubt, however, that if sufficient playgrounds could be provided for every school or for certain groups of schools, the benefit would be enormous, and I believe that the providing of proper playgrounds is almost as essential as providing a proper school-house. The question of how this is to be done I will touch upon later. The education of the brain for purposive movements is attained to a great extent by such games as cricket, because the players are obliged not only to throw, to strike, or to catch the ball, but to do so in accordance with definite rules, and the discipline of the cricket teams is as strict or stricter than that of a regiment. Its captain allows no shirking, no loafing, no inattention, and the work of every player must be thoroughly co-ordinated with that of every other. For teaching bodies of children ordinary movements, marching and drill are exceedingly useful, as the habit of prompt obedience and action together is thus learned. In Switzerland I found that the games are looked upon as being quite as important, or perhaps more important, than drill, and they are supervised by the teachers, who take care that the weaker, who might otherwise be driven to the wall, also have their fair share of the fun, and the lazy, who might be inclined to shirk, also have to take their full share. But what is a fair share for each boy? It is sometimes exceedingly difficult to say, because the attempt

to shirk play may really result from physical inability, and I have seen boys who have been forced to play in accordance with their apparent size and strength suffer from cardiac strain because their hearts were too weak for their overgrown bodies. But here the teachers and medical officers of schools can work hand in hand, and medical inspection will show how far physical exercise can be pushed with advantage and when it must be stopped to avert injury. With the aid of the medical officer it will be possible to classify the children according to their physical strength and regulate their games accordingly. This plan is carried out in the gymnasium at the University of Pennsylvania, where all the undergraduates are obliged to have courses of physical training. Previous to this they are subjected to medical examination, their weak and their strong points ascertained, and instead of their being allowed to take such exercises or to play such games as would unduly develop their strong points, perhaps to the detriment of their weak ones, they are subjected to such training as will strengthen their weak points and bring them up to the full standard of health.

MILITARY TRAINING.

And now we come to the question of military training in schools, a question upon which there is a considerable divergence of opinion. The nation, as a whole, has settled the question that it will not have conscription if it can possibly be avoided, and yet we are beginning to feel that with our enormous responsibilities and our small Army we are not in a position satisfactorily to maintain the security of the Empire. Perhaps we might not be able even to defend our own shores in the event of a coalition against us of some of the great Continental Powers. No doubt our Navy is the first barrier against invasion, and ought to be kept as strong as possible, but the man is proverbially a fool who puts all his eggs into one basket, and we ought not to rely upon our Navy alone. We ought to be fully competent to defend our shores against any invader in the event of unforeseen disaster occurring to our Navy, and in these days of submarines and torpedoes, who

can say what will happen? The Boer war showed us what can be done in the way of fighting by boys of fourteen who have been accustomed to handle a rifle all their lives, and there seems to be no reason why our boys should not be quite as ready and quite as able to fight, in case of need, as the Boer youths. We do not want any military *régime* in this country; we do not want to encourage a spirit of aggression; but we do want to be able to defend our homes and our families from possible invasion. Our nation is essentially a peaceful nation. We do not want to go to war with any foreign Power, and the way to avoid war is to prevent them from attacking us by preparing ourselves thoroughly for defence. Little children might be taught their drill with sticks and bits of ribbon—and I do attach a good deal of importance to the bit of ribbon—and as they grow older they should learn to shoot at miniature rifle ranges, which I think should be attached to their school, and the children should be encouraged to become proficient in marksmanship. Inter-scholastic competitions might be arranged both for marksmanship and drill, and once or twice a year, perhaps, all the schools in the district might have regular manœuvres, so as to teach them what would be necessary in order to combine together for defence in case of foreign invasion. But all this physical training involves waste of muscle and waste of nerve on the part of children, and if they are not sufficiently fed even for their ordinary tasks it is obviously impossible that they can undertake physical training in addition.

PROPER FEEDING.

And this raises a most serious question, namely, the feeding of school children. The same ignorance and incapacity on the part of the mothers which prevents them from providing appetising meals for themselves and their husbands naturally affects the children in even greater measure, for children's appetites are apt to be more capricious and fastidious than those of grown-up people. In addition to this there are many of the poorest classes who can hardly provide sufficiency of food of any kind for their children. How, then, are these

difficulties to be met? First, by providing nutritious and appetising food at a cheap rate for the children of those who are ignorant and slovenly, but who are able to pay for the materials of a good meal, and only cannot or will not cook it properly. Secondly, by providing food for the children of those who are really unable to buy a sufficient quantity of food, to say nothing of its quality. With all diffidence I may suggest that both of these difficulties may to a certain extent be met by cooking classes attached to each school, at which the children not only cook but *eat* the meals. The quantity to be prepared every day would allow greater opportunities for all the girls to learn cooking. The food, which could be supplied at a small rate to those who could pay, would probably be more appetising than what they could bring with them from home, or perhaps even than they could obtain at home if they were able to go there between the school hours. There can be no doubt that pauperising the people by the provision of free meals is inadvisable, and whatever parents can pay for their children they ought to be made to pay; but the State has already determined that whether they will or not they must have education, and if the child is starved the whole provision which the State makes for its education is lost, so that it seems to me that if the parents will not feed the child it should be fed at school, and the authorities should come down upon the parents for recompense just as the authorities come down on the parents for allowing the child to remain away and lose the opportunities provided for its education. In cases where the parents cannot really afford to provide proper sustenance for the child it would probably be really cheaper in the end to feed it at the public expense. As my friend Dr. Eichholz has very clearly put it, if we feed these children while they are growing we now spend money, but if by so doing we enable them to grow into strong men and women, and to utilise the education which is given to them, we enable them in later years to earn their own livelihood, and very likely keep them and their children off the parish. We spend on them in their youth, but we save a good deal more than this expense in later years by keeping them off the rates. If a

town-bred boy were to go to the country and see a man casting wheat broadcast over a field he would be very apt to say, "What a wasteful man this is, throwing good wheat away which might have been ground up and made into food for a number of people"; yet anyone who knew about farming would say to him, "You are a fool; the wheat which is cast into the furrows is not waste. It will multiply itself twentyfold in the course of the year." I think it may be much the same with money expended on food for children who would otherwise be starved.

HELP OF TEACHERS.

There are yet other subjects which I might touch upon—continuation schools, technical training, and the great advantages to be gained by fostering the spirit of emulation, both amongst pupils and teachers; but I fear I have already trespassed too long upon your time. I have brought before you many things which you teachers, and you alone, can do, and I think I hear you say that I am worse than Pharaoh of old, because he insisted that when no straw was supplied to the worker the tale of bricks should not be diminished, but here I come and ask you to do a great many new things, and thus add to the burdens which you have to bear, and which are already too great. But this is not so. I recognise that the work done by the teachers in this country is like the work done by the builders of the great cathedrals of the Middle Ages. The work done by these men has been wonderful; it still remains the admiration of successive generations, and yet not only the names of the workmen, but even of the architects, are often buried in oblivion. Often these men must have been vexed and grieved that they could not carry on their work as they would for want of funds, because we frequently note that the great cathedrals have been built bit by bit, with long intervals between.

CO-OPERATION OF WORKERS.

You are doing a great work, and it is not with the desire of putting heavier burdens upon you that I make these proposals

to-day, but it is with the desire of getting every class in this country to co-operate with you, to be fellow-helpers, that the doctors may aid you with their advice, the lady visitors by looking after your pupils in their homes, mayors, provosts, town councils, squires, rich men by providing proper school accommodation and playgrounds, and the legislative bodies of the country by giving heed to your representation and carrying out the measures you know to be required. It is evident that such a work as this requires the co-operation of all classes, and it is with a view of obtaining this that a National League for Physical Education and Improvement has been proposed. You have already done an enormous amount of work, very often not only without proper reward, but even in spite of discouragement. You have already shown what you have done for the rising generation, how much you have the mental and bodily welfare of the nation at heart, and if the teachers of this country approve of the National League and give to it their sympathy and help, I am certain that the success of the League will be assured.

PROPOSED LEAGUE.

But I wish you, ladies and gentlemen, to note that this League is not brought before you as a full-grown institution, which you are only asked to forward. It is still only a *proposed* League; it is still in its infancy; it has not yet been brought formally before the public. The draft scheme is in your hands, but it contains only the general outlines, and requires to be worked out in detail. Your experience, your advice, your help, are all required in order that it shall be worked out on proper lines, and therefore it seems right and fitting that it should be submitted to this body before it is brought to the notice of the general public. In forming a Federation of the Associations of Head Teachers you have already begun the work proposed by the National League, for its great object is the co-ordination and extension of those bodies which are already at work for the good of the people. By getting all such bodies to work together we hope that each

rising generation in this country will become stronger, wiser, and better than the preceding one, and I thank you most sincerely, ladies and gentlemen, for the opportunity of bringing before you a scheme which, with your help, may do much to bring about such a desirable result. But please observe, ladies and gentlemen, that both your help and sympathy are needed and that your assistance is required.

HARRISON AND SONS,
PRINTERS IN ORDINARY TO HIS MAJESTY
ST. MARTIN'S LANE, LONDON, W.C.

ADDRESS

ON A

NATIONAL LEAGUE FOR PHYSICAL EDUCATION AND IMPROVEMENT.

*Delivered at the Annual Meeting of the Manchester Children's
Hospital, February 24th, 1905, by*

SIR LAUDER BRUNTON, M.D., LL.D., F.R.S.
(Consulting Physician to St. Bartholomew's Hospital, London).

MR. CHAIRMAN, LADIES AND GENTLEMEN,

I am greatly honoured by the invitation to address you to-day, and to bring before you the proposed National League for Physical Education and Improvement.

To take care of the young is one of the strongest instincts, not only in human beings, but in the lower animals, and many pathetic tales are told of the devotion and self-sacrifice which animals exhibit in order to protect and save their progeny from injury or death. So firmly implanted is it in the human breast, and so general is its action, that when we hear of parents who are careless of their children, or, still worse, are cruel to them especially when sick and suffering, we regard such people as either unnatural monsters, or as being temporarily deranged at the time either by mental disease or intoxication. It is satisfactory to think that where one such example of carelessness and cruelty occurs, hundreds, nay thousands, are not only willing to care for their own children, but are willing to sympathise with and to help those whose parents are either unable or unwilling to care for them. And many there are especially in large towns like Manchester, who would gladly give everything they have for their children's good, and yet are unable to afford the medical advice, the care, the attention, the carefully-chosen food, and the medicines which are needful to save their children from death and restore them to health. It is a fortunate circumstance that there are so many who are

willing out of their abundance, in some cases perhaps even out of straitened means, to relieve such misery by the establishment and maintenance of children's hospitals. The work that is being done by the Manchester Children's Hospital is very great and increasing. It includes three departments: the treatment as out-patients, the treatment in the hospital, and the treatment at home. No less than between 22,000 and 23,000 out-patients, or fully 4,000 more than in 1903, were treated at the dispensary. I learn that 3,742 were treated at home, and 1,663 were sent to the hospital. It is hard to estimate the good to the community which this represents. It is not merely that the lives of the children are saved and sorrow averted from their homes; it is not merely that the children themselves are saved pain and suffering; but that children whose lives would have been stunted by disease in their youth, and who would have grown up incapable of work, and a burden to their friends or to the ratepayers, are rendered strong and healthy, so that they may take their full share in the work of life in after years. In the report of this Institution the causes of death are divided into constant and variable. Amongst variable causes the epidemic diseases, measles and whooping cough, play a very prominent part. The difficulty of avoiding infection from these diseases is very great, as the infective matter is conveyed in the breath, and thus thrown out to a considerable distance from every patient. How far such infective matter is thrown out few of us have any idea, but you may form a notion of it if you will watch a cab-horse on a foggy day and see to what a distance the vapour of the breath can be seen passing from the nostrils. But even this gives one a very imperfect idea of the distance to which infection will spread in the breath, for a savant who put gelatine plates around a room found that when speaking in an ordinary tone of voice his breath carried microbes to a much greater distance than could have ever been guessed at from the visibility of breath in a fog.* One can, therefore, see how advisable it is that children suffering from measles and

* M. H. Gordon, 'Thirty-second Annual Report of the Local Government Board (Supplement) for 1902-3, p. 421.

whooping cough should be kept apart from others if we wish to avoid infection. It is sometimes thought, in regard at least to measles, that the infection is so subtle and so all-pervading that there is almost no chance of escaping an attack and that it is better to have it over at once. How far there may be an element of truth in this I will not venture to decide, but one may be perfectly certain of this, that the exposure of children already enfeebled by other diseases to the infection of measles and whooping cough is in the highest degree inadvisable. Not only is there the chance of death during the attack, but the weakness which results from measles and the secondary effects, or, as they are termed in popular language, the dregs of measles, are so severe that the danger from them is even greater than from the disease itself. Long-continued bronchitis and swollen glands are very common, but the most dangerous, perhaps, is the liability to tubercular infection of the lungs. Measles, seems to prepare the way for the tubercle bacillus, and when this attacks the lungs of the already weakened children there is very little, if any, chance of their recovery. They are doomed, as the popular term "consumption" shows, to waste away until they die. But during this wasting process each child may form a focus of disease and convey consumption, not only to its brothers and sisters, but to its parents as well. It is impossible to prevent children with measles or whooping cough coming for treatment to hospital. It is impossible for the mothers to know definitely what is the matter with the child, and, even if they did, they would probably think first of the child's interest and bring it for treatment, regardless of what might happen to other children. It is, therefore, most necessary to have some means of isolating children suffering from infectious diseases from others in the out-patient room, and it is most satisfactory to learn that the board of this hospital have already taken steps to secure a site for the enlargement of the out-patient department, so that children suffering from infective diseases may be isolated, and the dangers to which I have already referred may be averted. With increasing numbers of out-patients more facilities are required for surgical work, and here, too, we may hope that

those who have already given so largely to the Manchester Hospital, and have raised it to such a state of efficiency, will not allow it to remain behind others, but will provide the funds necessary to make it as good as others elsewhere. And perhaps here I may direct their attention to the out-patient department of the Western Infirmary at Glasgow as an example of what an out-patient department ought to be. I trust that the citizens of Manchester will not allow themselves to be outdone by their northern neighbours, and will supply accommodation as good, if not even better, than that of the Western Infirmary. The third most important factor in the mortality of variable disease is infantile diarrhoea. This disease depends very closely upon external temperature, and Weir Mitchell made a very remarkable curve showing that the number of cases occurring in his clinique varied almost exactly with the external temperature. Great heat, no doubt, tells upon the babies themselves, and weakens their resisting power, but the general way in which it produces diarrhoea is by causing the milk with which the babies are supplied to undergo change whereby it becomes converted from a useful food into a dangerous poison. It is not only milk which is actually sour that is harmful, for milk just beginning to turn sour or "on the turn," as it is sometimes called, turns sour in the stomach, and has the same injurious effect as if it were sour in the bottle. The addition of so-called preservatives to the milk appears sometimes to make it even more dangerous than when sour, for while these preservatives prevent the action of the bacillus which causes lactic fermentation and produces acidity, they allow other bacilli to act which instead of producing acidity actually produce virulent poisons, poisons which are all the more dangerous because they are not readily detected by the taste and smell as sourness is. Boiling destroys all bacilli, and not only keeps the milk sweet for a longer time but prevents the poisonous change of which I have spoken, and also prevents danger from infection by typhoid germs which might be present in impure water used to wash out the churns. Milk may not only have a poisonous action itself and may convey typhoid infection from water mixed with it, but it may convey other diseases. Many of you may

remember the epidemic of scarlet fever in Manchester which was traced to a milkman having come straight from his house where his child was lying ill with scarlet fever to the farm and milked the cows, evidently with his hands unwashed. Thus fever was distributed broadcast over the city, and not only so, but as this occurred just on the day the schools were breaking up, the children went to various places in the country, and thus from one farm whole districts became infected. It would, therefore, seem that all milk should at once be boiled, and that by always providing boiled milk instead of raw milk children would be saved not only from the risk of diarrhœa but of many other things. But while boiling greatly lessens the risk, either from souring, putrefaction, or contagion, it has the great drawback that it alters the milk and renders it less suitable as a food for children, so that those fed upon it are likely to become affected by scurvy. As Dr. Eustace Smith, in his "Diseases of Children," has put it, boiling destroys the anti-scorbutic properties of the milk. What these properties may be due to at present we do not know, but I think it is not improbable they are due to certain ferments contained in raw milk. We now know that in the body there are various glands, the secretions of which are not poured out on the skin nor into the intestine, but into the blood, and these glands may have a most important effect upon nutrition and growth, so that, for example, when the thyroid gland in the neck becomes atrophied the child becomes stunted in growth and feeble in mind. These secretions owe their activity to ferments contained in them, and such ferments are destroyed by boiling, so that the secretions become inactive. Whether the destruction of ferments in milk be the cause of the change in it produced by boiling or not, we may be quite sure that a very definite change is produced in milk by boiling, and a change too which renders it less suitable as a food for children. But while the increase of diarrhœa in summer is one of the chief causes of the variable mortality, diarrhœa in general is one of the most important causes of the constant mortality. It is sad to see how great this mortality is, and it is perhaps even worse to know that most of it depends upon preventable causes. No less than one-third of the total infant mortality occurs in the first month of life and one-half in the first three months.

This enormous mortality amongst the babies is partly due to the feeble constitution which they inherit from their youthful and weakly mothers, but it is due in much greater extent to the fact that these babies do not receive from their parents the care which a bear bestows upon its cubs or a hen upon its chickens. Ignorance, carelessness, the difficulties connected with the milk supply, and last but not least the indifference, neglect, and poverty begotten by habits of chronic drunkenness, are, as stated in the Medical Report of your Hospital, the causes of mortality which no amount of excellence in hospitals can prevent. How then is this evil to be met? There are already in existence a great many charitable and beneficent agencies all working to combat the evils which we deplore, and so many are there that one would say to bring another into being was not only superfluous but injurious. Yet we all know the story from "*Æsop's Fables*" which delighted our childhood of the old man and the bundle of sticks, each stick being weak and easily broken by itself, but when united into a bundle being able to resist any strain. Now, the agencies at present at work may be likened to the individual sticks. Each one is working at its own department, but they are all isolated. Many of them do not know of each other's existence, and so they lack union and do not possess the strength to accomplish the end desired. It is now proposed to establish a new League, a National League for Physical Education and Improvement. This League is not to be another stick added to the bundle, it is to be the band which will unite them together and give them the strength which they individually lack, and I thank you most cordially for the warm sympathy you express with it, and for the support you promise it in the Report of your Hospital. As stated in the draft scheme, the object of the proposed League is not to displace any of the agencies at present at work, but to make them known to one another, to ascertain how their work can best be supplemented, where it is deficient, and to extend the benefits of physical training throughout the whole country. In order that the League shall fulfil the purpose for which it is designed it will require to be subdivided, firstly, according to the places

where it is to act, and, secondly, according to the work that it has got to do. We trust that it will act all over the country, but if we return again to the simile of the bundle of sticks we will at once see that whereas it is very difficult or impossible to tie together a big bundle with one cord so that the sticks do not fall apart, it is easy to tie up a few sticks into small tight bundles and to unite a few of these together with a larger band, and finally encircle the whole with a girdle which shall include them all. It is, therefore, proposed that the League shall be divided into local branches. There ought to be a branch in every hamlet, a larger one in every parish and small town, and larger branches in several towns according to the population. For example, there ought to be in Manchester a branch at Audenshaw, Barton Moss, Barton-upon-Irwell, Davyhulme, Denton, Droylsden, Failsworth, Flixton, Gorton, Heaton Norris, Levenshulme, Moss Side, Prestwich, Stretford, Swinton and Pendlebury, Urmston, Whitefield, Withington, and Worsley. There ought to be a branch for every ward in the city, and these branches should elect representatives to form a general council for the whole of Manchester and the surrounding district. There ought to be similar councils in every large town in the United Kingdom and in Ireland, and finally there ought to be a General Council to which delegates should be sent from the large towns or large country districts so that the workers throughout the whole country may be kept in touch with one another. We have an example of an institution of this sort in the British Medical Association, where the whole country is mapped into branches with local divisions. Every branch of the proposed National League should have its own autonomy, however small it may be; it ought to have its president and chairman, its treasurer, and secretary, its council and its visitors. From each small branch delegates would be sent to the larger branches, and these to larger again, until finally the delegates would come to the General Council. It is only by securing a great deal of autonomy, along with co-ordination, that we are likely to reach the end we desire, for we wish that every man and woman in the country should be connected with the League,

and that every child should participate in the benefits that it is likely to confer. If this scheme is carried out it is evident that the proposed organisation will be an enormous one, and it will take a considerable time to organise.

But supposing it be organised, what is it going to do? First of all it is to find out what needs to be done; secondly, to find out how the needed work should be done; and, thirdly, to do it. Now, we already know in a general way a good deal of what needs to be done. Life goes on and on, and as one life dies another begins. One might fix upon any part of the cycle as a beginning, but perhaps the most convenient time is to take the mother shortly before the birth of her child. In towns such as Manchester, as the Report of this Hospital states, the mother is not only young and weakly, but she is ignorant, and in consequence of this ignorance she often renders herself still more weakly by continuing her work in factories almost up to the time the child is born instead of giving herself a rest for some time before. The first thing to be done is to remedy this ignorance if we can. In all that I say here I must beg you not to think I am speaking with any authority, nor as having been commissioned in any way to give advice, but only as throwing out suggestions for your consideration, for although the objects of the League have been considered and approved generally by those who have given their adherence to it, the details have not yet been worked out, and the experience of those who have been doing so much to further its objects in Manchester will be most valuable in drawing up a definitive scheme for its working. The ignorance of the young girl who is just about to become a mother might, perhaps, be enlightened to some extent by advice given her at the Hospital or Dispensary when she applies for someone to attend her during her confinement. She might then be told of the disadvantage of continuing to work until confinement took place, and at the same time might be instructed as to what preparations she ought to make for the baby's advent—what clothes she should have ready, what assistance she should get for carrying on the work of the house until she was able to get up, and how she should feed the baby. She might then learn what an enormous advantage it would

be to her child if she were able to suckle it, and if this be impossible she might at least be taught how not to poison it by improper food. In some cases, perhaps in many cases in Manchester, the necessity for earning food may be such as to make the mother work until the very last moment. But if it were to become a practice that every girl about to become a mother should, when applying for assistance during her confinement, have not only her name and address but her circumstances inquired into, the most necessitous cases might be reported, and, perhaps, some provision might be made to ensure food and care for at least a couple of weeks before and after confinement. I say a couple of weeks, not that I mean such a limitation is desirable, but this I think should be the minimum. At the birth of the baby the mother should be instructed how to feed the child, and although this should be done beforehand, as I have said, by printed leaflet, yet the instruction should now be given in a very different way by actual demonstration. The nurse who is in attendance on the mother and child for the first short time after confinement should give this instruction, and the duty of visiting the mother and seeing that everything was carried out rightly might be undertaken by lady visitors. Each branch of the League would get a list of confinements about to come off, and the ladies of that particular branch could attend to the mothers in their district. I think it almost certain that infant mortality must have been greatly increased by the introduction of feeding bottles with long tubes, because it is almost impossible to keep tubes clean, and each time that fresh milk is put into them it is infected by bacteria from a dirty tube, and decomposition thus initiated before ever it reaches the baby's stomach. But, even if bottles be kept perfectly clean and aseptic, there is still the difficulty of obtaining good milk. I have already spoken of the dangers of contamination of milk by water containing typhoid germs and the impairment of the nutritive qualities of milk by boiling. In order that milk may be supplied in a state of purity in large towns it has been proposed that municipalities should undertake this work and establish milk depôts throughout all the large cities and towns, but this would

not only interfere with established industries but it would probably be less efficient than if the municipality simply insisted that the dairymen should supply milk up to a certain standard, with heavy penalties if they failed to comply with the municipal requirements. I feel sure that many of the large dairies would be quite willing to do this, and would use every means in their power to supply perfectly pure milk, but they would be greatly assisted in this work if every farm supplying milk were registered and medical officers of health were empowered to make visits of inspection whenever they thought it necessary. But to ensure that this was done it would be almost necessary to obtain security of tenure for the medical officer, for such visits might be very distasteful to some members of the Board of Guardians. The dairy farms are the source of the milk supply, and they ought to be safeguarded if the supply is to be good. Another danger to the milk is in transit, because the cans are not always sealed, and they may become contaminated between the farm and the dépôt in town. To prevent such contamination each churn should be sealed by the firm, and this seal should be unbroken when it is delivered in town. But adulteration and contamination also occurs to a very large extent in the distribution of milk from the large dairies in towns to the consumers, and this must be carefully guarded against. To ensure a proper milk supply, then, co-operation is wanted between the corporations in town, the dairymen, the railway authorities, the medical officers of health in the country, and the farmers. To obtain this legislative action will be requisite, and therefore corporations, legislature, and medical officers would all have to work together, and their union for this purpose would be one of the objects of the League.

For the care of babies whose mothers are obliged to go out to work, an extension of the crèche system has been proposed, and here again the services of women workers and women inspectors would be invaluable. Perhaps under the strain and pressure that exists in manufacturing towns such a system may be the only alternative to excessive infant mortality, but at the same time every effort should be made to maintain the natural relationship between mother and child, to teach her to regard

it as her own and not as a thing to be laid aside and allowed to die unless prevented by benevolent outsiders.

Next comes infant schools, where a great deal may be done not only to render the child's life happy but to give it unconscious education. One great risk to be guarded against is that of educating it in a wrong physiological direction. Tennyson, who I think was one of the most physiological poets that ever lived, has put the order of development very well in the "Princess," where he describes the actions of a baby lying on the ground when he saw its mother. It began "to laugh, and dance its body, and to stretch its fatling innocent arms and lazy lingering fingers." The movements of respiration, of which laughing is a modification, are the most fundamental, then come those of the trunk, then those of the arms, and lastly those of the fingers. In a paper at the recent Conference of School Hygiene in London a speaker pointed out that mischief might perhaps be done in infant schools by training the fingers at too early an age, and that in consequence of this the finer motor centres became unduly developed, and irregular movements and chorea might afterwards result. The proper curriculum at schools is now engaging a great deal of the attention both of the Board of Education and outsiders. The shortening of the hours of study, the abolition of home lessons for young children, intervals between lessons, proper ventilation of schools, breathing exercises, drill, free movements, gymnastics and games are all being carefully considered, and a great deal has already been done to improve these things by the Board of Education. A number of interesting papers on this subject were read at the recent Conference of School Hygiene, which is preliminary and preparatory to the International Conference of School Hygiene to be held in London in August, 1907. At this Congress we may hope that well-considered schemes of work, exercise, and play, not only from this country but from all the countries in the world, will be brought together for discussion and comparison, so that this country may afterwards be enabled to adopt the best possible scheme. But in the meantime most of those who have studied the subject recognise that no scheme, however good, is equally applicable to all children, because

children vary enormously in their powers and capacities both of body and mind. Work or play which would be too little for one child is far too much for another, and therefore children must be inspected and classed according to their faculties, physical or mental, so that medical examination is absolutely requisite in order that their proper exercise or play may be rightly allotted to them. In all physical exercises we have two things to consider, the training of the body and the training of the mind. For the training of the body and the lower nervous centres, free exercise, either with or without apparatus, and musical drill are advisable, and drill without music is not play. It is an exercise in attention, and although, after the children are used to it, it may become almost automatic, yet it is very far from being so at first, and may indeed involve considerable mental strain. Perhaps no games are so useful for training both body and mind as games of ball, and especially cricket, but the disadvantage of cricket is that it requires so much room for so few players. I have been informed by Mr. C. B. Fry, however, that much of this difficulty can be got over, and games of ball can be arranged which will give amusement and training even in such limited space as can be given in school houses. But there is a great difference between playing in a room and playing in the open air, and not only do we want enlarged accommodation for play around the schools, but we want large playgrounds with easy conveyance of the children to and from them. In cities like Manchester, ground in their centres is too expensive to allow of its use as playgrounds, and here the assistance of the corporations is needed. It is well to beautify towns, it is well to put up statues to natives who have been famous, it is well to have ornamental parks, but more necessary than all these is ample room for children to play. The National League hopes to obtain these by the exertions of its educational, medical, legislative, and its municipal members, who in this matter are the most important of all. But if children's bodies are to be trained in schools as well as their minds, they will want more food. As we all know, active physical exercise usually induces a greater desire for food, and if children's bodies are to be trained as well as

their minds by physical exercise in school their appetites will almost certainly increase, and they will want more food. Without food, exercise of body or mind is exhausting, and instead of leading to increased growth, rather prevents it. Even at present many children go to school insufficiently fed—so much so that their brains do not act, and they do not gain the advantages that they ought from the teaching that they get there. Are we, then, to feed all school-children? This is a very important question, and, I think, requires very careful consideration; for it is just the people who have least care for their children who will be most likely to take advantage of free food, and throw their children more and more upon the outside public. This is one of the very things that the League desires to avoid, because, while I have been speaking very largely at present of its use for children, it is intended to embrace adults as well, and a most important part of the education of adults consists in training them to look after their own children. Perhaps the difficulties may be best met by having luncheon bars, or *cantines scolaires* as Dr. Macnamara calls them, either attached to the schools, as in country places, or detached from them, but yet near, as might be necessary in towns. At these bars food both appetising and nutritious might be provided more cheaply than at home, because it would be prepared on a large scale either in school kitchens or municipal kitchens. At these bars the child might secure breakfast or dinner on presentation of a ticket, and this would be preferable to giving the child money, which it might be tempted to spend upon sweets. The parents could buy these tickets, and in cases where they were able to pay for them, and did not provide the children with food, they ought to be forced to do so. In the few cases where it was absolutely beyond their power the food might be provided by charity, or else both parents and children would come upon the ratepayers as paupers, and would be treated accordingly. But here also the co-operation of visitors to make inquiries of guardians, and of charitable persons or societies is required, and this is one of the objects of the League. The large quantities which would require to be cooked might afford larger opportunities for

teaching children how to cook, and allowing them to taste afterwards the food which they had cooked for themselves. Cooking classes in schools I believe to be one of the greatest essentials in the whole of education. The children on their return home are likely to compare the cooking of the school with their mothers', and perhaps opportunities might be afforded for teaching cooking to those mothers who do not understand it and are yet willing to learn. Cooking classes in many schools are instituted by the Board of Education, but increased facilities for teaching even outside schools are required, and one of the objects of the National League would be to afford these. And here, again, lady teachers visiting women at their own homes may offer the greatest assistance. When a man is exceedingly thirsty he will drink water if it is put before him, and if the thirst be very great he will drink the water even if he knew it were poisoned. The thirst for alcohol is somewhat different from that of water, and the causes of this thirst are manifold: but there can be little doubt that one of them is a feeling of depression caused by want of proper and appetising food. Cooking classes, by supplying such a want, may thus indirectly lessen drunkenness to a greater extent than any amount of teaching or lectures, although the instruction of children regarding the evils of alcohol may help to make them shun it when they grow up. But after school hours are over what are the children to do? Are they simply to return to homes which in the slums of great cities are often squalid and uncomfortable, or amuse themselves by playing about the streets, or is their spare time to be taken up by hard work or service to which their parents may force them? This, again, is a difficult problem, for it is far from being advisable to interfere with home life and keep children away from home, and I believe that this a question of which there are many here who can give a more satisfactory solution than I can, and with them I will leave it. Perhaps a good deal may be done in regard to the amelioration of home life by having mothers' meetings in the school houses occasionally so that they may learn what their children are doing and take an interest in their progress, and at the same time be taught themselves how best to help their children. Then comes the

question whether schools might not be used for recreation, drill, or games out of school hours not only for children attending school, but for youths or girls who have already left it, for this is the time—one of the most important in the whole of life—when youths and girls are freed from the restrictions of school and have not yet settled down to the work of their lives. They are no longer under restraint at school, and may, perhaps, no longer be under any restraint at home, so that there is no one who can oblige them to do anything, and they can at present only be induced to do things that are for their good by making these things attractive. For them continuation classes, clubs, and gymnasia would be useful both for the girls and youths, while youths might be encouraged to drill as volunteers and be provided with miniature ranges in towns, and if possible, longer ranges in accessible situations. Whatever views may be held regarding the utility of the volunteers for military service I think there can be no doubt that their training occupies many an hour which would otherwise hang heavy upon their hands or be mis-spent and is useful in assisting the healthy development of the youths both in body, mind, and character. But for all these purposes not only money to provide the necessary halls and apparatus is wanted, but men and women are needed who will set to work and not only originate, but keep going all these brigades, clubs, volunteer corps, drill associations, rifle associations, etc. In addition to this we need associations for taking young people of both sexes into the country where they may learn its beauties which they only otherwise know from books or hearsay. It is strange, too, that in a country like ours, which prides itself on ruling the waves, such a small proportion of the people know how to swim, and swimming baths might be provided by the municipalities in larger numbers than at present. These might be used as baths in summer and as gymnasia in winter. But over and above all these things remains the question of overcrowding and all its attendant evils. How can food be cooked properly unless the fireplace is such that it can be done, how can children grow up pure if their homes will not admit of even common decency, how can they grow up healthy if they are crowded

like herrings in a barrel in a room without any ventilation and no rays of direct sunlight? Such dwellings are the breeding-place of disease, and it is no wonder epidemics spread. It is they that manufacture cases to be brought to hospital, and magnificent as the work is that is being done by the hospitals, the results would be still more magnificent if we could strike at the root of the evil, and we could prevent disease instead of curing it. But this is not the scope of hospitals. To cure such an evil we want the co-operation of the legislature, of the medical officers of health, of the municipalities, and last, but not least, we want the co-operation of the people themselves. As the report of the Physical Deterioration Committee says: "It is the apathy of the people that is one of the chief causes of the evil." By getting the husband to join a club where he may spend his evenings comfortably without drinking, by teaching the mother to make home more pleasant so that the husband may be induced to stay there, by rooting up slums, and not by only providing better dwellings, but by teaching the people how to utilise them, we may hope to do away with a great deal of the disease that requires at present to be treated in hospitals, and thus aid the work of the Manchester Children's and other hospitals. But for this many workers are wanted, men and women, who will devote their time and their energies to carrying out the good work. To help these all to work together, to combine the several agencies now in existence for the good of the people, and to enable them by their union, as I have said before, to attain the result which they could not by isolated action, is the object of the National League for Physical Education and Improvement. I thank you most heartily for the patience with which you have listened to me, and most gratefully for the kind sympathy you have expressed, and for the promise of support to the League which you have already given in your Report. I trust that ere long all arrangements will be made to have it in thorough working order in Manchester, where so much has already been done and so much is being done for the improvement of the bodies, minds, and characters of every class of the population.

THE REPORT OF THE INTER-DEPARTMENTAL COMMITTEE ON PHYSICAL DEGENERATION.

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MR. PRESIDENT AND GENTLEMEN,—I thank you for the honour you have done me in asking me to open the discussion on the report of the Physieal Deterioration Committee. There is no more fitting assembly in which to do it than this, because the evils which this report acknowledges must be in great part remedied by the efforts of two bodies, namely Medical Officers of Health and school teachers, and the combined efforts of these two will probably do more for the physieal welfare of the people than those of any other section or sections of the community. This Committee owed its existenece to an admirable memorandum addressed to the War Office by Sir William Taylor, Director-General of the Army Medieal Service, in April, 1903. In this memorandum he drew attention to Sir Frederick Maurice's statement that two out of every five would-be recruits were unfit for service at the end of two years, and showed from the recruiting tables that from 1893 to 1902, 34·6 per cent. were rejeeted on inspection, and 3 per eent. more were either rejeeted within three months or discharged as invalids before they had completed two years' service. This brings the total of unfit within two years up to 37·6 per cent., which is a little less than two out of every five, or the 40 per eent. which Sir Frederick Maurice had stated it to be. In eonsequece of this an Inter-Departmental Committee was appointed, and after 11 months of hard work presented the report which we are now about to discuss.

The first thing that strikes one is that the name of the Committee was an unfortunate one. As Sir William Taylor very clearly pointed out, the important question was not that of

deterioration as compared with past time, but that of physical inefficiency in the present. Yet in spite of his remonstrance the Committee in their conclusions have given much more prominence to the question of deterioration than that of inefficiency, and instead of recognizing the invaluable services which Sir Frederick Maurice and Sir William Taylor have rendered to the community by drawing attention to this inefficiency, they have rather slighted them by saying in their first conclusion that "the Committee hope that the facts and opinions that have been collected will have their effect in allaying the apprehension of those, who, as it appears, on insufficient grounds, have made up their minds that progressive deterioration is to be found among the people generally." After this soothing statement it is rather curious to find that the Committee state that in order that "the present 'acknowledged evils' may be removed, complacent optimism and administrative indifference must be attacked and overcome." But whatever fault may be found with the conclusions of the Committee, there can be no doubt whatever as to the enormous value of the information contained in the body of the report and in the evidence that they have collected. In regard to the question whether the whole population or even those composing certain strata have undergone deterioration, Sir William Taylor, in a second memorandum of November, 1903, pointed out that there are no reliable data for the past physical condition of the people, so that it is impossible to form any satisfactory comparison with the present, and to ascertain with any certainty whether deterioration is going on or not.* To this conclusion the Committee have also come (Par. 67).

In order that data shall be afforded for future comparison they recommend that a physical census of the people shall be taken, beginning with the children in schools and factories and extending it gradually over the population at large (Par. 423). The apparent decrease in the physique of recruits they consider to be due not to any actual deterioration of the population, but to the recruits having been drawn from a stratum of the people poorer and physically weaker than that which formerly supplied

* Report, p. 100.

them (Par. 30 of the Report). The conditions giving rise to this physical inefficiency have been very thoroughly investigated by the Committee, and it appears that, excepting where parents are affected by syphilis or drunkenness, the child inherits at birth a good physique, and if properly cared for in infancy and childhood it may grow up strong and healthy, although its father and mother may be physically weak from bad surroundings (Par. 247). Unfortunately the chances of a child born under such circumstances receiving proper care are small, for the weakness of the mother in a very large number of cases renders her unable to suckle her child, and the food that is given, either from ignorance, carelessness, or poverty, is quite unsuitable, so that the "sacrifice of infant life is enormous" (Par. 277). In addition to this census periodical measurements of children and young persons in factories should be taken. For this purpose, school teachers, factory surgeons, and a small staff of professional surveyors (Par. 423), may be able to superintend the process, but they cannot instruct the teachers, and the most likely person to be called upon to give instruction, will, I think, be the Medical Officer of Health. The medical examination of school children, which should not only be complete, but periodical, underlies, as the Committee very truly says, all schemes for improvement in school training (Par. 320). It is only by such examination that we can learn what the capabilities of a child are, and what amount of work, mental and physical, may reasonably be expected from it, and it is only by repeated examinations that we can ascertain what effect the school work and the school exercises are having upon it. The system of examination for mental work is already in full swing, and we now want that system extended to physical conditions. By such examination it will be possible to put clever and weak-minded children into different classes, to place the physically strong, the physically weak, and those suffering from unsuspected cardiac or other disease, in their proper group, and by adapting the mental and physical training to each we shall get the maximum of good and the minimum of harm. All this will take time, it will take skill, it will take attention and care, and who is to do it? Such,

inspection is no doubt a branch of public health, but can medical officers undertake it in addition to their other duties, remembering that it is not only for once that this has to be done, but that it must be periodical? Such inspection I think may well avoid a great deal of injustice. I remember when at school seeing a boy caned every day for not knowing his lessons, and great was his delight as he came to school one morning saying that he knew them perfectly. Poor boy! he was caned all the same, and I am quite convinced now that it was neither indifference, carelessness, nor stupidity on his part, but simply defective vision, so that he did not see what was written upon the blackboard; and so, however perfectly he had prepared his lessons beforehand, he was unable to do what the masters desired. A pair of glasses I feel sure would have saved him a daily caning, and would have saved many another child from headaches almost as frequent and perhaps even more painful. And what an amount of pain might be saved to children by periodical examination of their teeth, by the judicious application of a little bicarbonate of soda to remove actual aching, by extraction if necessary, and by the regular use of a piece of soft wood every night as a tooth-brush. In many cases, no doubt, timely stopping of the teeth might prevent further decay, but here again the question arises, who is to do it? At the same time that the teeth are inspected the medical officer would see the state of the tongue, and with the assistance of a question or two might find out facts of importance in regard to the child's digestion and the suitability of the food it was having. By examination of the ears the child might not only be saved much pain, but much danger, and by timely care mastoid abscesses or even meningitis might be prevented. Such examination too, in many cases, might show the advisability of a child's exemption from school for a while, and the risks it would otherwise run from exposure to cold, etc., might be avoided. For sometimes in going to school the child may get its shoes, stockings, and clothes wet and, having no change at school may sit there for hours with a chance of greatly aggravating any mischief in the ears or elsewhere, or even bringing on disease when the child was previously healthy. It is very difficult to

see how such risks can be completely prevented, but at any rate inspection would greatly lessen the dangers to which they would otherwise give rise, and the proper warming of schools suggested in recommendation 34 of the Committee's report requires special attention.

All the recommendations of the Committee must, I think, have the approbation of all medical men, and one of the questions for this Society to discuss is, how they had best be carried out, and what part Medical Officers of Health may be expected to take in doing so. In all probability judicious physical training will not only aid the growth of a child, but will make it more healthy generally, and give it more power to resist disease. Judicious physical training necessitates, as I have already said, a preliminary medical examination. A few months ago I went to Philadelphia, and was told that all the undergraduates of the University of Pennsylvania are obliged to go in for a course of physical training. Before doing so they are inspected medically and their weak points ascertained. The exercises are so adjusted as to strengthen the weak points and bring the men up as far as possible to an all-round standard of strength. Something of the same sort would be done by medical inspection, and the Committee are no doubt right in advising that regular gymnastic exercises, as well as games, should be included in the programme (Par. 308). The provision for proper accommodation for exercise in bad weather, and for playgrounds in good weather, would be one of the duties of the local authorities, and it will fall to the local Medical Officer of Health to see that it is carried out rightly. The feeding of school children is another question of the utmost importance, and the opinion of the Medical Officer of Health would in all probability be required, both as to what children are to be fed, and how they are to be fed (Par. 358-365 and Rec. 42, p. 91). If I may venture upon a suggestion, it seems to me that a regular school kitchen might be attached to every school, and in this meals might be prepared, and such children as could pay for them might buy, and those who could not pay might be provided for either by voluntary subscription or by the rates. The large demand for food which this would bring about would give ample opportunity for the

girls attending the schools to learn cookery, and the instruction which they would receive in the art of preparing palatable meals at a cheap rate would not only be useful to the children themselves in their own future life, but it would probably re-act upon their mothers at home, and might induce them to learn a little more about the way of preparing food. At the same time that the children are learning how to cook food, they might receive instruction as to the comparative values of the different kinds of food, and the best way of spending money so as to get the utmost value for it. Such school kitchens might perhaps sometimes give cooking lessons to adults, and occasional lectures on food and food-values might perhaps be given to them, and here also the services of the Medical Officer of Health will probably be required to give them instruction, or to secure those who are capable of doing so. Schools should thus become great object lessons to children in ventilation, exercise and food; but in addition to this there should be systematic instruction in the general principles of hygiene, the evils of alcohol, the disadvantages of early smoking, and the injury that may be done by excessive tea-drinking. In this way we may hope that the rising generation will know a good deal more about the laws of health than their predecessors; but the mothers and fathers may also be instructed by occasional lectures. A great deal may be done by lady visitors who will visit the homes and see that the general principles in lectures, or at school, are actually being put into practice. It will I think not be difficult to get such visitors full of enthusiasm, energy, kindness, and sympathy; but what they will need will be information and direction, and here the Medical Officer of Health may work with them and through them to the great advantage of all concerned. We have been talking of the feeding of children and adults, but now we come to one of the most important questions of all, the feeding of infants. There can be no doubt that if mothers were not to work for at least one month before and after delivery, it would be much better for their progeny, but the difficulties of enacting a law to this effect are great, and might be productive of much hardship. We may hope to amend things by and by, but as things are

now we must accept the fact that a great many mothers for one reason or another are unable to suckle their children, and the children will be fed artificially. If the child is to be satisfactorily reared, milk in some form is indispensable. Some infants may thrive even upon condensed milk and cereal foods, but for the great majority fresh milk is needed, and the difficulty of getting milk, clean, fresh and unadulterated in towns is considerable, especially for those belonging to the poorest of the population. It has been suggested that the municipalities should provide milk depôts. For my own part I am inclined to think that instead of doing this directly the municipalities would do better to arrange with the large dairy companies in whose hands the chief supply at present lies, and oblige them under a heavy penalty to supply milk which will conform to the requirements laid down by the municipality. I believe, however, I am right in stating that the President of your Society, who probably knows more about this than any one else, is at present engaged in drawing up a scheme for the proper supply of pure milk to towns. As I know from sad experience in my own family, there are some children whom it is impossible to bring up on ordinary cow's milk, however pure it may be, or however diluted; and I believe that if such children are to be kept alive it is necessary to provide them with milk in which the various ingredients are properly adjusted in accordance with the child's needs according to a doctor's direction in a laboratory, just as the ingredients of a doctor's prescription are made up for him by a chemist. I think that the proportion of such children is quite a small one, but that they do exist I am certain, and without provision being made for them they will certainly die. Such provision I think might be made by establishing small hospitals scattered throughout large towns where the worst cases might be treated indoors, and the less serious ones might perhaps be treated as outdoor patients, while each such hospital, as well as the out-patient department of general hospitals, should be a focus for disseminating information regarding infant feeding by means of verbal instruction and printed leaflets, whilst lady visitors, by visiting the parents at home, might see that the instructions

were properly carried out; these visitors having, as I have already said, themselves received instruction from the Medical Officers of Health.

The last, but not the least, question which I shall touch upon is that of house accommodation. Over-crowding, with its attendant evils of uncleanness, foul air, and bad sanitation, stands out prominently in the opinion of the Committee as prejudicial to the health of the people (Par. 82). Over-crowding is almost certain to arise if people will flock in from the country to the towns, and that they do so in great numbers there is no doubt, for to every one who lived in a town in 1851 three do so now (Par. 80). This may perhaps be diminished by making country life more attractive, country homes more comfortable, the food in them more appetising, the cottages more attractive, and by providing some sort of amusement in country villages or country districts for men and women after the day's work is done. Much no doubt should be done in regard to country cottages, and building bye-laws require to be carefully supervised lest they do harm instead of good. I may be quite mistaken, but it has occurred to me that one of the forces that is driving people from the country to the towns is the difficulty of getting cottage accommodation, a difficulty which to some extent is due to the combined action of the law of entail, and to the change in agricultural conditions brought about by ocean steamers and cold storage. On account of the cheap freights, wheat and butcher meat can be brought from America and Australia with great ease, and sold in this country at such rates as to keep down the price of home-grown wheat and home-grown meat. The depression of the price of meat of course affects also the value of root crops and feeding stuffs, and in this way the value of land for agricultural purposes has become enormously depreciated. Rents have consequently gone down, and many men who own enormous estates have their incomes from the land so much reduced that, burdened as they often are with the payment of jointures or of mortgages, they are in reality so poor that they cannot afford to build new houses on their estates. This difficulty might possibly be met in two ways, first by making it easier to break the entail and

sell part of the heavily burdened properties so as to relieve the remainder, or else by some provision by which joint stock companies should be allowed for a perfectly nominal ground rent to build cottages on such estates and draw the rents directly from the tenants. Companies building cottages in very large numbers could probably put them up more cheaply than others, and one of the great causes which is driving the country population into the towns would thus be done away with. In towns the effect of over-crowding in raising the death-rate came out very prominently in the evidence before the Committee (Par. 86), and they think that in order to lessen the evils the local authority should, with a view of settling a term to these evils, exercise their power to treat any house, or any part of a house, so over-crowded as to be dangerous or injurious to the health of the inmates, as a nuisance, and for the abatement of the same notify that at a given date no one-room, or two-room, or three-room tenements will be permitted to contain more than two, four, or six persons respectively (Par. 87). The slums must go, and in their removal, as one witness very truly said, everything must depend on the powers of the Medical Officer of Health, on the keenness with which he exercises these powers, and in the way in which he is supported (Hawke's Par. 13011). As things are at present, the Medical Officer of Health, by the very thoroughness with which he discharges his duty, may incur the dislike or resentment of some of the local authorities by whom he has been appointed, and they will in consequence try to get him discharged, if they can, sometimes unfortunately with success (Par. 13511). In Par. 118 and Rec. 9, p. 86 of the report the Committee makes a proposal which seems to be a good one, that the Medical Officer of Health should have security of tenure and not hold his office at the good will of the local authority. Behind the Medical Officers of Health stand at present the Local Government Board, but the offices of this Board are so manifold that it is impossible for it to discharge them all properly, and perhaps the best thing for the country would be to have a Board of Health. There does not seem to be at present very much chance of such a Board being appointed, and in place of it the Committee propose an

advisory Council which should represent the Department of State within whose province questions touching the physical welfare of the people fall, with the addition of members of the community by the medical corporation and others, whose duty it should be to receive and apply the information obtained from a bureau of the Local Government Board with the whole weight of Government authority and scientific prestige behind them. It would be their function to advise the Government on all legislative and administrative points in respect of which State interference in health matters was expedient, consider and report upon all problems of public health, and guide the action of representatives in this country in foreign congresses of public health (Par. 64, 124, 302, and p. 85).

Failing a Board of Health such an advisory Council would in all probability be a great service, and the Society that I am now addressing may do a great deal to insure that these recommendations are carried out, and also to insure that the advisory Council is constituted in the right way and with proper powers. The question of public health is a very complex one, and however much those who take it up are interested in it, however hard the various associations which are working for its attainment may toil, it is hardly possible for them to succeed if they work singly. In order that the common end may be successfully attained they must all work together, and it is with the object of attaining co-ordinate action that it has been proposed to found a National League for Physical Education and Improvement. The object of this League, as stated in the draft scheme of which copies have been supplied to you, has for its object not to displace any of the agencies at present at work, but to make them known to one another, to ascertain how best their work can be supplemented where it is deficient, and to extend the benefits of physical education throughout the whole country. In every parish the squire, the parson, the minister, the school-master, and the benevolent woman, and in towns the mayors, or provosts and corporations, should be induced to take part in the organization for carrying out all the means of physical improvement which have been touched upon in this address. This league has not been brought formally before the public,

because it has been thought better to have the scheme thoroughly worked out before this was done, but men of all classes and in every part of the country have already agreed to support it. It was felt that as the purposes of the League are closely connected with medicine, it was better to have it backed by medical men before other classes of the community were asked to join, because most of them are less able to judge of its merits or demerits than medical men, and they will consequently be led to decide their action in regard to it chiefly by the leaders of the medical profession. At present, with the exception of a few men who have been very active in promoting the League, either in London or the provinces, only men holding Court appointments or official positions as heads of medical corporations have been asked to join. Amongst those who have consented to act as Vice-Presidents, I am glad to say is the President of your Society, and I trust that as soon as the League is publicly brought forward, not only every Medical Officer of Health and every school teacher will join it, but that every man and woman in the country may become associated with it, and that every child may derive benefit from it. Although the Committee in its conclusions say that in carrying out their recommendations for the rectification of acknowledged evils they do not rely upon any large measure of legislative assistance, yet the proposed League, by numbering amongst its members all the men and women who know what is necessary, and many Members of both Houses of Parliament who will act upon such knowledge, may bring about legislative improvement such as no single body at present could hope to effect, at least in a moderate time. Through it the Medical Officers of Health may be able to bring about quickly much-needed changes which they see to be necessary, and if they and the school teachers combine with others, who, like them, have the welfare of the nation at heart, they will be able to carry out thoroughly the measures which the Committee advised in their third resolution, namely, "complacent optimism and administrative indifference must be attacked and overcome, and a large-hearted sentiment of public interest take the place of timorous councils and sectional prejudice." In

conclusion, gentlemen, let me again thank you for the honour you have done me in letting me open the discussion, I beg you to pardon me for the very imperfect way in which I have been able to fulfil the task, and ask your approval and assistance for the proposed National League for Physical Education and Improvement, a league by which I believe that the recommendations of the Report of the Inter-Departmental Committee on Physical Deterioration may be carried into effect, and the welfare of the nation, which both you and I desire so greatly, may be secured.

PROPOSED NATIONAL LEAGUE FOR PHYSICAL EDUCATION AND IMPROVEMENT.

OBJECTS OF THE LEAGUE.

It is obvious that as the causes of physical imperfection are so numerous and act upon such numbers of people and over such a wide area, the means to combat these causes must also be various in kind and must act over the whole length and breadth of the country.

A great number of agencies are already at work giving instruction in the rules of health, in housekeeping, in cooking, and in the feeding of children. Others are trying to lessen the consumption of alcohol by supplying nutritious food in its place. Others again are trying to improve the physique of the rising generation by supplying gymnasia in town or country; by organising associations for physical exercise, such as cricket, football, drill associations, cadet corps, boys' brigades, rifle clubs, volunteer corps, and girls' clubs.

In the social class immediately above the lowest class of the population there are boys and girls whose occupations are sedentary and their wages small. They cannot afford to join tennis, cricket, football, and similar clubs. For these young and growing persons gymnasia and swimming baths should be available at a nominal cost. Already many municipalities are converting the swimming baths used only in the summer months into gymnasia for the winter months.

The numerous associations which are all working for the common object of increasing the physical development and well-being of our population are at present under the disadvantage of not knowing what the others are doing, and of being even unaware of their very existence.

DRAFT SCHEME OF THE PROPOSED LEAGUE.

The object of the proposed Physical Education and Improvement League is not to displace any of the agencies at present at work, but to make them known to one another, to ascertain how their work can best be supplemented where it is deficient, and to extend the benefits of physical training throughout the whole country. The League would thus be subdivided in a two-fold manner, territorially and functionally.

Territorially it would be divided into local branches. In each parish and in each small town there ought to be a branch, and in larger towns several branches, according to the population.

Several branches should become associated into a district, and several districts into a county or borough branch. These might not only co-operate with one another, but also by a healthy rivalry might stimulate one another to active efforts.

Functional division is necessary, because the objects requiring attention are so numerous.

Each branch should furnish instruction to the people on the laws of health generally, to mothers on the care of children, to girls on the methods of cooking and housekeeping. Physical exercises and opportunity for open-air games should be given to both boys and girls; while the natural desire of boys to become volunteers should be encouraged, and drill, rifle, and shooting practice and all sports fostered. In every parish the squire, the parson, the doctor, and the schoolmaster, and in towns the mayors and corporations, should be induced, if possible, to take part in their organisation, whilst there should also be a committee of ladies to supervise the instruction of mothers and the care of children. The work to be done in each district would be subdivided, the ladies would undertake the teaching of mothers and the inspection of houses and children, the schoolmaster and mistress would supervise the physical exercises and games of the children, the squire or mayor, or others interested in the subject, would look after the provision for playgrounds, rifle ranges, club rooms and drill halls, and we feel sure that the doctor would give general advice and assistance wherever he could.

A great deal of work would be done locally by the branches, but it would be necessary to have a central bureau in which any branch might apply for any information or help which it required. It would also be part of the work of the League to initiate changes in, or additions to, existing laws, when such changes or additions seemed necessary, and the immense amount of information which would then be at the disposal of the League would render its advice invaluable. Amongst other objects to be aimed at would be the medical inspection of school children.

DISCUSSION.

Sir JOHN GORST, M.P., said that although as a matter of fact he had merely come as a listener, he could not refrain from supporting the proposals made by Sir Lauder Brunton, with which he cordially agreed. He greatly rejoiced at the way the movement had been taken up in the country by the medical profession generally. He considered they were the most competent body in the country to deal with it, and if they took it up seriously it could not fail to be a success. For many years, long before this Committee was appointed, all those who were engaged in the work of elementary schools of this country were conscious of the great proportion of children who went to the schools totally unfit to receive the education provided for them. An Act was passed, therefore, controlling the work of school children out of school hours in the endeavour to promote a better condition among children. The proper body to take action in this matter is the educational authority, the local authority, and town councils, who have very wide and general powers, even sufficient power without legislation to do anything to promote the general health of the children. The best thing they and the League could do would be to bring pressure to bear on all local authorities throughout the country to move in the matter at once without waiting for legislation. The first thing to go for is a medical inspection. They might at least get a medical inspection of children when they first went to school, and thus have record kept of the actual condition of the children when they first attend school. By supplementing this with periodical examinations, it should bring home to the educational authority the actual condition of the children they are attempting to instruct. But the inspection would only tell them what the mischief was, and then how were they to cure it? In his opinion by far the best plan was to have a Board of Visitors attached to every school. He referred to what had been done in connection with the Tower Street School, in Seven Dials. A voluntary committee of ladies had been formed there six years ago, and the schoolmistress reported to them any instances of ill-nourished or ragged children, or those suffering from any ailment or disability of any kind. The members of that committee then visited the parents, gave advice, and no doubt assistance. In six years the result is that whereas £40 was spent every winter in feeding young children in this school they now only spend £6, and the children are better clothed and happier than they were. In fact, the system carried on there is so satisfactory that when the parents remove from the neighbourhood they send their children great distances in order to attend it. He did not think it would be a very costly thing to feed all the children if a proper system of visitation were adopted. The residuum of children whose parents could not afford to feed them would be so small that they might be fed by the public authority.

Dr. Eichholtz, an Inspector of the Board of Education, who was before the Committee, said that there were two classes of the children in the very poorest districts who stood out in great contrast to the rest, and these two classes were the Jews and Irish. Their children were better fed and healthier than the other classes where they lived. This has been confirmed by Dr. Hall, of Leeds, an ex-factory surgeon, who devotes himself to an examination of this kind. He gave the speaker a description of two schools in the very dirtiest parts of Leeds. They were both Board Schools under the local authority. One was frequented almost entirely by Jews and the other by Christian children, and the contrast was marvellous. It was apparent at once on entering the schools. The parents of the one class were as poor as the other. But with the Jews it is part of their religion to take care of their children; the mothers usually suckle the children, and the fathers make great sacrifices to bring them up, and that, he considered, was the reason they were such a healthy class. He thought that if they organized visiting committees they might bring the English Christian mothers up to the same level as the Jews and the Irish. He had been travelling about the country a great deal, and found that this question of feeding the children was exciting great interest everywhere, especially amongst the working classes themselves. He was strongly of opinion that some step should be taken in this direction, and thought that pressure could very easily be brought to bear on Town Councils and Boards of Guardians, as they were elected once a year. He felt sure that the effect of the movement now taking place would be that the local authorities would be stirred up to improve the condition of the children. He was of opinion that they possessed sufficient powers to make a very great change in the condition of the children of the poor without waiting for the very slow progress of legislation in the House of Commons.

Dr. H. FRANKLIN PARSONS, speaking in his private capacity as a Member of the Society, and not as an Official of the Local Government Board, said that he had listened with very great interest to Sir Lauder Brunton's paper, which, no doubt, deserved the highest consideration. At the same time he thought a few words of caution were needed. In the first place, he thought they would do harm rather than good by adopting measures which would in any way tend to diminish the sense of individual responsibility. It was the tendency of the present day to assert the people's rights and wishes and pleasures, before their duties, and they ought not to lessen in any way a parent's responsibilities towards his children. Sir John Gorst had given a very good illustration in his description of the two classes, the Jews and the Irish. He personally was afraid that free meals for school children would tend to do harm rather than good, because it would relieve parents from the sense of responsibility, and wages might be lowered, as was the case under the old Poor Law. Secondly, parents would have more money to spend in drink, which is one of the prominent causes of deterioration.

He thought that Sir John Gorst's suggestion of visiting committees was a very good one, and reminded them that the system already existed in regard to the boarding out of pauper children. Another way would be through County Medical Officers of Health. Every county ought to appoint a Medical Officer of Health, and as the county is the educational authority, the supervision of the health of the children might well form a part of his duty. He considered that neither the county nor the local Medical Officer of Health could make such a periodical supervision of the children as had been suggested, but they could supervise the work. If the children were periodically weighed and their height measured, and any noticeable defects registered, anyone examining the register would see if the children were improving, and if not it would be a duty to see what was the matter at home. They must have some regard to the cost of the proceedings they recommended. By putting extra burdens on the community they might be doing more harm in one direction than good in the other. What he wished to say was that by raising the rates it would be a greater burden on the working classes than on any one else.

Miss ANDERSON (Home Office) said that she considered it a great honour and privilege to be allowed to address the meeting. Speaking in her private capacity, she considered that although the lady visitor, the "benevolent woman," was possibly a great asset for public health, she lacked training, and this might be taken up with advantage by the League. Many women had very little opportunity of learning how they could help, and, as regards the parents, she thought that their mistakes were more due to ignorance than lack of will. Her own opinion was that girls of all classes in this country, from the highest to the lowest, required longer teaching in order to prepare them for motherhood. It was impossible for them to learn hygiene from English mothers of the present day, they all required teaching. She considered there were two directions in which progress might be made—one an expensive method, by lengthening the education of the girls; the other by recognizing the need of women who could teach, and by giving them a special training. She hoped that eventually the result of the proposed League would enable the mothers to remain at home and tend their children instead of being compelled to go to the factories as at present.

Dr. J. C. MCVAIL considered that the Society was immensely indebted to Sir Lauder Brunton for the way in which he had brought forward the question, and it was impossible not to sympathize with the speaker in regard to the title given to it by the Committee. They all knew that there was abundant physical deficiency, but they did not know whether it was greater or less than it was fifty years ago. There was no doubt that the population in towns had greatly increased, but at the same time the death-rate in towns and country districts had fallen immensely. It might be conceivable that the modern sanitary conditions ought to

be such as to allow unhealthy people to live a longer life than healthy people fifty years ago. As to the first recommendation, the establishment of anthropometrical measurements, he did not think the Society should push the matter too strongly. Were they likely to get such a thing from a Government which would not grant a quinquennial census or pay for a meteorological observatory on Ben Nevis? That sort of thing might be done in Germany, but he did not think it would be possible in Great Britain. He thought they were just at the beginning of a great advance movement in public health. Up to the present they had been occupied in environment, with the improvement of the environment of the individual. They had made great progress in that direction, and now they were beginning to attack the individual himself. He thought, however, that the advice tendered by Dr. Franklin Parsons should be borne in mind. They could not make all people equal. What they wanted was to give every child a chance, and for that purpose it was right to go to the individuals and try to find out what defects they had, but there must be as much voluntary organization as possible in the matter. He thought the suggestion of Sir John Gorst with regard to committees connected with every school an admirable one. There would have to be official supervision, but the money should go from the pockets of the benevolent. He called attention to the fact that in connection with the Scottish School Board one authority had recently taken two working class dwellings, and had appointed teachers and practical housekeeping for each, so that the children might learn cooking and domestic economy. By this means every girl had several hours tuition weekly in such dwellings as she would be likely to eventually occupy in her station of life. With regard to the reference to depreciation of agricultural land, he thought that the new system of vehicular traffic by motor cars would have a beneficial effect on rents, as it would enable large factories to be established in country districts. An attempt is already being made in Glasgow. The University printers have taken their works right out into the suburbs, and have built proper houses for their work people. He considered the appointment of an Advisory Council a very excellent suggestion. Personally, he thought that if one could get at the actual minds of the great public departments they would find that they are thoroughly in sympathy in all these matters, but the mouth of the official is closed. The Advisory Council would at least be able to tell the country what it thought after studying the subject.

Dr. ARTHUR NEWSHOLME said they were greatly indebted to Sir Lauder Brunton for having been the means of introducing such a valuable discussion. Sir Lauder Brunton's presence there that evening reminded him that he was one of the men who had given the death-blow to polypharmacy. At the present day they appeared to be passing through a polypharmaceutical stage of preventive medicine, and a large number of empirical remedies were suggested

for present evils. But they had not dug down to the root of all the mischief. The statistical bases on which Sir William Taylor's remarks were based as well as those of Sir F. Maurice, were shown to be entirely untrustworthy, and the army medical statistics were not only misleading but extremely fallacious. He thought, however, they should be grateful to Sir William Taylor and Sir F. Maurice for having initiated an agitation out of which good might come. It seemed to him that Sir Lauder Brunton had really defined three main evils, *viz.* overcrowding, deficient or improper food, and alcoholism. Here again, in the report of the Committee and elsewhere, they had the same lack of distinction between primary and secondary causes. For instance, overcrowding took place either because people were too lazy or indolent to spread themselves, or more frequently because they cannot afford more house room. Either they cannot afford it or spend their money in other directions, or the rooms cost too much. The building of houses in towns was bound to become dearer and dearer. There is no possibility of cheapening houses, and there is only one way to deal with the matter, and that is by increasing wages, so that people can pay a fair rent. Then as to the question of deficient feeding, a matter which Sir John Gorst had taken up with great skill. Why are the children improperly fed? Either the parent does not earn sufficient or he spends his money in the wrong direction. Therefore in the first case give him higher wages, but do not supplement his earnings by the State. If he spends his money wrongly, he should be compelled as far as possible to give his money to his family, so that they may be properly housed and fed. Sir John Gorst had said that the residuum of children who required to be fed was a very small one, and might be fed by the local authority. He considered that Sir John Gorst had thereby given away his case entirely. If the residuum was a small one, why should the State step in? In his, the speaker's town (Brighton) they gave away 600 breakfasts every morning.

In many cases they were obliged to decline to give the breakfasts. He agreed, however, that underfed children are totally unfit to receive the education that is given to them, but at the same time they are in no worse case than children outside the school. He did not for one moment argue that they should not be fed. Indeed, the small residuum of cases left over they were all most anxious to help, but they must be picked out with the most rigid discrimination. They were all agreed with regard to the committee of visitors recommended by Sir John Gorst. But he, personally, disagreed with Dr. McVail's contention that it is impossible to have proper anthropometrical observations of the children. He considered they ought to have them once a year. As to free breakfasts, he thought the working classes would have to give them if they were given. He ventured to think, however, that voluntary organization was not yet exhausted and that there was no need to call in State intervention.

Dr. A. K. CHALMERS said he appreciated to the utmost Sir Lauder Brunton's paper. He considered that the inspection of school children had a practical value. For instance, in Glasgow they had been carrying on some investigations which showed that children graded almost definitely to the size of the house they occupied. Further, whatever may be said with regard to feeding the children, they must accept the alternative; either feed them or allow them to grow up in the class of inefficient. Following the London experiment referred to, the Glasgow School Board had taken over a school for little children. The difficulty was to feed them. As they had no fund to meet the cost of food, the ladies who organized the mission called on the parents and said that the children could be educated on condition that the parents paid the expense of food. The actual cost worked out at a trifle over $1\frac{1}{2}d.$ per meal. For $9\frac{1}{2}d.$ per week the child got food, and after four or six weeks it was apparent to the teachers that the children were physically good. The value of that illustration he thought was that whether the parents have to pay or the State has to pay, the argument in favour of the State paying is the growth of the inefficient. That Jewish children turned out better physically on inspection he understood was the case in all places except Glasgow. He did not think they had a worse type of alien than the Jews in Glasgow. They were not physically better in comparison with the Christian children, and he found that the Jews were very much worse as regards eyesight. In conclusion, he would like to associate himself with everything that had been said in connection with home visitation.

Dr. KERR, referring to the report, said he thought that the proportions in which the subjects had been treated had been altogether lost sight of. The feeding of children had also been somewhat exaggerated in the report. The children that are underfed form a very small residuum. At least that was his own experience, and he thought that it was also the experience of Dr. Chalmers in Glasgow and Dr. Newsholme in Brighton. Underfeeding must be correlated to inefficiency in the parents. As to the question of the Jews, almost unfair use had been made of that argument, because he thought there was such a thing as racial habit of body. At the same time, they found that the Jews lived, flourished and fattened on a diet which English children would not touch. They ate an enormous amount of fat. In his opinion the child in school at once suggests itself as a means of getting hold of a mass of people. We may regard that child as a potential citizen. We also have the other side of the question, the purely educational side, which to a great extent was the view he was compelled to take for practical purposes. Undoubtedly, this class of work must come under the Medical Officer of Health in the future, although he did not think, as far as the educational aspect was concerned, that it would be the best solution. He referred to all those questions of cleanliness, etc., where the school doctor and school nurse come in. The school

nurse in London is an efficient person visiting the house, and this personal aspect, as Dr. MeVail pointed out, is the new aspect which is opening up in public health. Each person ought to be taught to make himself fit. The teacher must be taught hygiene and the child must be taught. They wanted to compel them to treat themselves hygienically, and that is the method which is being followed up in London now. Whatever plan is formed the parent is compelled to have it treated so far as the law allows it. He thought it would be generations before the question was properly dealt with, unless the screw was put on in Government quarters. The only way by which it could become general was through the Board of Education, but that Board had been plunging along for generations, apparently without any medical control, although for a small sum this work could be organized throughout the country by a medical department. As to anthropometrical measurements of samples, he thought it would be an excellent plan, but measurements as a general thing throughout the country were not worth the money. They must, however, have samples.

Dr. RALPH VINCENT had been impressed by an argument with which he sympathized, and it was that everything should be done to increase the sense of parental responsibility. He wished also that they could do something to increase the sense of responsibility of the House of Commons. He was of opinion that unless they took steps to see that the children were medically inspected no successful results would follow. The question of the feeding of infants was, he considered, a most serious one. In the present state of affairs amongst the working classes the mother could not feed her baby in a natural manner, and the wages of the working man would not allow him to provide a substitute. As to the production of milk, it was a matter which had been absolutely neglected. Some people wanted to boil it first, others required it sterilized, but Nature intended that it should be consumed without coming into contact with the air. In no other way could they prevent milk from contamination. Consequently, when they proceeded to handle such a dangerous product as that they had to take special measures to meet the case. He considered it very dangerous to give poor people milk, and that sterilized milk should be dispensed with at once. Further, he was of opinion that all municipal milk depots should go by the board. Milk was a most dangerous product to deal with, and no adequate measures had yet been taken to control it.

Dr. J. HOWARD JONES, referring to the difficulty of moving the Board of Education, said that last year, acting on his advice, his Board passed a resolution that after Jan. 1, 1905, they would not allow children under four years of age to attend school. This was reported to the Educational Department, and the County Council had received a letter from the Board of Education stating that they had no power to exclude children under four years of age.

He considered that the efforts of School Education Committees should not be treated in this way by a Government department.

Dr. FRANCIS J. ALLAN said that he could bear out the statements of Sir John Gorst in regard to the Tower Street school, as he was personally acquainted with it and the methods adopted there. During the last fifteen months they had instituted a Health Society in the City of Westminster, in which they had enlisted the services of district visitors of all creeds. Most of the visitors knew very little about the subject at the commencement of the Society, so that the greater part of the 15 months had been occupied in teaching them. Now that they were becoming used to the work, they were found to be extremely useful. They report directly to a sub-committee for their particular district, and they had found that there were very few whose parents were so destitute that the children could not have sufficient food, but they did find that they suffered from badly prepared food. Too many parents squander the money in drink they ought to spend on food. They had a very considerable Jewish population, and so far as infants were concerned, the mortality among Jewish babies is very much smaller than it is amongst other nationalities. He had found, however, that when the Jewish children grew up they were quite as susceptible to consumption and zymotic diseases as Christian children appear to be.

Mr. WOLF DEFRIES, B.A., ventured to express the great satisfaction which he felt in seeing a subject of this kind under the consideration of that Society. The question of physical degeneration had undoubtedly engaged the attention of all those who had taken part in the discussion. They had, no doubt, some personal experience, but the one class of man who in the conscientious discharge of his duty had inevitably both the maximum of opportunity of observing, and a training second to none in the interpretation of observations of this character, was the Medical Officer of Health. He therefore welcomed the discussion on those grounds.

Dr. C. SANDERS desired to place before the meeting the plain facts regarding his authority (West Ham), as Dr. Franklin Parsons had incidentally referred to the borough. The West Ham rates are now 9s. 10d. in the pound; they were 10s. Four years ago the local School Board were coerced by the Education Authority to build a new school, and in order to comply they had to apply to the Local Government Board for funds. The fiat went forth from that body that any municipal trading was to be very seriously checked. Some one whispered that the West Ham rates were 10s., and West Ham was used as the whipping boy. The Loans Board said that they would not lend. In between these two Government departments his Board were unable to build the schools, but now that the Town Council were the school authority, the foundations were going in. As to Sir Lauder Brunton's paper, he wished to emphasize the necessity of not overlooking parental responsibility.

He should be sorry to look forward to the day when the Medical Officers of Health could do without mothers. He could see no reason why the municipal authority should approach the children. He did not see why they should see to them from the time they were born. It is an age of sanitation, and anything that can be labelled sanitation is seized upon by every one nowadays, and he was afraid that sanitation had run to seed. It was a matter of common knowledge that there was a large amount of distress in West Ham. It had undoubtedly been magnified, but fortunately funds were opened, and a huge sum of money was subscribed. A great deal of money just before Christmas was wrongly applied, but there was a balance, and the proposal was to hand it over to the Emigration Society, so that 500 families should be assisted to emigrate. What will be the result? The Emigration Society will come down to West Ham and pick out just the families that I should like to keep there to keep down my death-rate. The good, honest, sober people will be picked out and drafted to the Colonies, and their places filled by the ne'er-do-wells and casuals. This he considered was diametrically opposed to the science of sanitation.

The PRESIDENT (Dr. J. F. J. SYKES) said that the subject was so very wide and the report of the Committee was such an *olla podrida* that it was difficult to deal with it. They had had placed before them by Dr. Franklin Parsons an illustration of how far they were going in assisting the children. Personally he would go a step further, and feed the mothers, for he considered that the evil was in the feeding of the mother. He was disappointed at the insufficient statistical bases in the report of the Committee to found definite opinions upon. To take one illustration, Dr. Tatham supplied the Committee with a very excellent table as to the deaths of children, but the ages of the infants were never extracted. Some years ago the Registrar General did extract the ages of children dying under one year, comparing three agricultural counties with three manufacturing counties. The result was to show that the toll that the manufacturing county took was greater. He, the speaker, had taken two periods and compared the statistics for his borough. He found that exactly the opposite result was taking place to that ascertained by the Registrar-General. For instance, in 1891, as they ran back from the twelfth month the incidence of mortality increased as they advanced towards the mother. The toll was the greater during the first quarter of the life, and apparently the proportion of deaths was increasing at this period. If it was true it meant that the mothers produced the children with less viability. Dr. Tatham pointed out that immaturity was one of the largest causes of the higher mortality amongst infants. Dr. Chalmers had been working at the same thing in Glasgow, and he had got the same results as the speaker. Could we prevail upon Dr. Tatham to have extracted some figures to show if there was any truth in it? If he could get the same results for all the urban districts,

it would be a remarkable result, and would show that there is less viability among the children coming into the world now. That would be due to certain social habits which were creeping into the habits of the mothers. It might also be due to artificial food, but that was not the case in St. Pancras. He (Dr. Sykes) wished to quote some figures which the *Times* had published in an incomplete form. The *Times* compared the mortality of Preston, which all Medical Officers of Health know is where infantile mortality is the highest in the kingdom, and it showed that the deaths from diarrhœa in Preston had fallen enormously, *viz.* from 197 in 1897 to 103 in 1904. During these two years the earth temperature was exactly the same. He had taken out some figures for other places for the same periods:—

Localities.	3rd Quarter		3rd Quarter	
	1897.		1904.	
London	243	..	208
Battersea (Milk Dépôt)	243	..	204
St. Helens	294	..	256
Liverpool	329	..	320
Preston (Lady Inspectors)	..	449	..	208

Preston does not possess any milk dépôts, but has women inspectors, while Battersea, St. Helens, and Liverpool have milk dépôts. These figures, of course, may be susceptible of some explanation, and may not bear the interpretation he had put upon them. In addition to feeling sorry that the Committee did not get out the figures referred to, he was equally sorry to see that they recommended all those measures by which the infant could be separated from its mother. Factory work, the institution of milk dépôts, crèches, in fact, every institution which tended to separate parent and child.

Sir LAUDER BRUNTON, in replying to the discussion, said Dr. Newsholme seemed to think that Sir Frederick Maurice and Sir William Taylor were rightly sat upon for having brought forward wrong data, but these data were supplied by the Inspector-General of Recruiting. The data were right enough, but the conclusions drawn from them were inaccurate. They asked for an investigation, and they thought that, taken as a whole, the records had failed in physical deterioration, and, unless he was mistaken, the Committee admitted that they had failed in that direction and said that the reason was not that the whole population had deteriorated, but that they had struck a lower stratum. He considered that they had done a great deal of service in drawing attention to the existence of this stratum. On the question of feeding the school children, there is one country which spends an extremely small amount of money on its army and navy—it has none—but spends an extremely large proportion on education. He referred to Switzerland, and had made enquiries in Berne on the subject. He found that most of the children attending the schools

were fed by the parents, but a small proportion are fed by voluntary aid. A minute proportion are fed by the parishes. The system worked well. He was convinced that the great majority of unfed children might be fed by voluntary committees without assistance from the rates. The fundamental cause of the evil was summed up in the quotation, "My people perish for lack of knowledge." The lady visitor would do a great deal, but who would instruct the lady visitor? The Medical Officer of Health should instruct her. And who will instruct the teacher? It is the Medical Officer of Health who will have to look after the playgrounds, the measurement of the children, and upon whom the whole thing falls. Increase the number of Medical Officers of Health if necessary; increase his powers; increase certainly his tenure. They could not expect to do away with one of the greatest evils without making his tenure secure. He referred to the question of overcrowding, which is associated with alcoholism. To do away with overcrowding the Medical Officer of Health alone could act, and how could they expect him to do it if he is liable to be turned out of his position because he says that such and such a slum should not be allowed to exist? One of the first things to do was to make sure that a Medical Officer of Health had a proper tenure. Carry out these suggestions, and then "Our people shall no longer perish for lack of knowledge." He asked them to help forward the National League for Physical Education and Improvement. It was still in embryo, but was brought before them as one of the most powerful bodies in the country, and it was for them to see that it was put on right lines. He therefore asked them to pass the following resolution:—

"That the Incorporated Society of Medical Officers of Health expresses its sympathy with the objects of the proposed National League for Physical Education and Improvement, and is prepared to give advice and assistance in the promotion of the League as may lie in its power."

The bye-laws of the Society having been unanimously suspended, the President put the resolution to the meeting, and declared it to be carried unanimously. A vote of thanks to Sir Lauder Brunton was carried by acclamation.

PROGRESS OF PROPOSED NATIONAL LEAGUE FOR PHYSICAL EDUCATION AND IMPROVEMENT.

By LAUDER BRUNTON, M.D., F.R.S.

The Boer War has given to Britain some much-needed but hard lessons. I say "given" instead of "taught" advisedly, because the latter word to some extent implies learning and it remains to be seen whether the British public has learned and will profit by their lessons, although they were impressed at the time by disaster and sorrow and are so still, by increased taxation and scarcity of money which renders the struggle for existence harder and cuts off many of the little luxuries and enjoyments by which the struggle might otherwise be alleviated.

One of the great lessons the War has given is that of England's unreadiness. Englishmen are accustomed to think with pride of Alfred the Great, and they are pleased to think that the qualities which distinguished that wonderful man, his fairness, his justice, his courage, his determination not to be beaten, his constancy and perseverance leading to final triumph still characterize the English race. But another quality which gave to Alfred's elder brother the cognomen of Ethelred the Unready is only too evidently a characteristic of English governments. In the Crimean War our unreadiness caused our soldiers to die in thousands more from avoidable disease than from the bullets of the foe. Tennyson's spirited poem "The Charge of the Six Hundred," while it makes our pulses throb with pride at the noble actions of our countrymen, leaves us with a deep sorrow that so many brave men should have been slaughtered because someone had blundered. Surely our experiences in the Crimean War might have taught us the necessity of being prepared for war in time of peace, but the Boer War found us again unprepared, and again blood and treasure were poured out lavishly, uselessly, because of our unreadiness. De Wet's History of the taking of Spion Kop is not pleasant reading.

The gloominess of the story is only lightened by the evidence it affords that our soldiers still possess the same spirit which animated the "Six Hundred" in their famous charge. We glory in their courage, their steadfastness and their endurance, and we deplore that their lives should have been sacrificed, to a great extent, needlessly. For had they possessed the same training as the Boers, the result of the actions would have been to them a comparatively bloodless victory, instead of awful slaughter and shameful defeat. But, as Sir Conan Doyle says, "With the experience of the first Boer War behind them," i.e., the military authorities, "little was done either in tactics or musketry to prepare the soldiers for the second. The value of the mounted rifleman, the shooting with accuracy at unknown ranges, the art of taking cover—all were neglected."*

This is a sad record, and what makes it worse is, that England did not lose her slaughtered sons only—she also lost their offspring, who would probably have inherited their father's qualities of courage, strength and endurance, a sturdy stock fit to uphold Britain's honour and defend her flag.

No doubt those who fell in the war formed but a small part of the total population of Great Britain, and brave and strong though they proved themselves, they for the most part belonged to a class rather below than above the average physical, because "the bulk of our soldiers are drawn from the unskilled labour class, and consequently from the stratum of the population living in actual poverty, or close to the poverty line."† But this class is not one which can readily spare such men as fell, for they were its stronger members, and the weaker were left behind to multiply. The weakness and "unfitness," as Sir William Taylor has aptly termed it of this class is so great, that out of 679,703 recruits in the ten years 1893-1902, no less than 234,914 or 34·6 per cent. were rejected on medical examinations as unfit for service. Nor does this rejection of more than one out of every three would-be recruits at all represent the unfitness of the class from which they are drawn. For these applicants were selected, they were men chosen by the recruiters as likely to pass

* "The Great Boer War," by A. Conan Doyle. 13th impression, London, 1901.

† Sir William Taylor.—"Report of the Inter-Departmental Committee on Physical Deterioration," Vol. I, page 96, par. 6.

the medical examination. There are no definite data available to show what proportion these applicants bear to those who were judged by the recruiters to be unfit. In all probability the proportion rejected by the recruiters is greater than that rejected by the examining officers, and even though the total proportion if "unfit" should not amount to three out of every five, as estimated by Sir Frederick Maurice, it is almost certainly a very large one.

Such a condition of the class from which our soldiers are chiefly drawn is sufficient to cause very grave concern indeed, for it means—from the military point of view—that in order to maintain our Army we will be obliged, either to raise the pay of our soldiers sufficiently to attract men from the more highly paid artisan classes—and thus greatly increase the burden of taxation—or resort to conscription. Nor is the condition much less serious from the civil point of view, for if these men are unfit for military service—What are they fit for? Moreover, it is uncertain whether this unfit class is not only a large but also an increasing one. Putting aside all other causes of unfitness, it seems to be generally accepted that the proportion of unfit is larger in cities than in the country, and the tendency to forsake the country and congregate in cities is so great, that between 1891 and 1901, for every single individual added to the country population, no less than thirteen were added to that of the towns. Public attention was directed to the gravity of the situation by the writings of Sir Frederick Maurice, and the appointment of a commission to enquire into the subject was suggested by the writer of this article.* This enquiry was initiated by a Memorandum to the War Office by Sir William Taylor, K.C.B., Director General of the Army Medical Service.† In consequence of this an "Inter-departmental Committee on Physical Deterioration" was appointed. The name is an unfortunate one, for it implies comparison with conditions in the past, whereas, the subject of vital importance is, the condition existing at present. This was pointed out not long after the appointment of the Committee by Sir William Taylor, who said

* Lauder Brunton, *The Lancet*, February 14th, 1903.

† Sir William Taylor, Report of the Inter-Departmental Committee on Physical Degeneration, Vol. i, page 100.

“I also regret that the words ‘physical deterioration’ have been adopted in the designation which has been given to the Committee. I consider that it is impossible to obtain reliable statistical or other data regarding the conditions that have existed in the past, and consequently, as no reliable data are obtainable for purposes of comparison, I do not see how the question can be dealt with from the progressive deterioration point of view. Whether or not there has been, or is, progressive physical deterioration among the classes now in question is a matter of very grave importance no doubt, but in my opinion it is not the chief question from a practical standpoint. To my mind the principal question for the Committee to enquire into is the causes and present extent of the physical *unfitness* that undoubtedly exists in large degree among certain classes of the population.”*

The correctness of Sir William Taylor’s opinion is shown by the statement of the Committee, that their efforts to obtain information of a statistical or tabulated character, which might form the basis of a comparative survey of the health and physique of the population, the Committee were not very successful. As a matter of fact no such information on a comprehensive or systematic scale exists. “The need for such information has been fully appreciated by the Committee, and they consequently recommend a regular anthropometric survey of the population. This survey should include an examination at two ages, of every child in school attendance, and also a more comprehensive and specialist survey of the population at large, or of definite districts. A classified register of sickness should also be kept. From the data thus acquired it will be possible, after some years, to come to a definite conclusion as to whether deterioration or improvement is occurring in the population as a whole, or in any part of it. But as the Committee very truly say :—

“It may be argued that there is here no immediate remedy, and that years must elapse before the lack of knowledge is supplied; but in regard to the evils, the existence of which is admitted, the Committee have recognised what can be done in the interval, and are confident that if their recommendations are adopted a considerable distance will have been traversed towards an amendment of the conditions they have described.

* Sir William Taylor. Report, Vol. i.

“In the carrying out of their recommendations for the rectification of acknowledged evils the Committee do not rely upon any large measure of legislative assistance; the law may with advantage be altered and elaborated in certain respects, but the pathway to to improvement lies in another direction. Complacent optimism and administrative indifference must be attacked and overcome, and a large-hearted sentiment of public interest take the place of timorous counsels and sectional prejudice.”*

But how is all this to be done? What power is to step in, remove evils, prevent deterioration, and improve the “unfit,” until they become worthy citizens of a great nation? Legislation as the Committee admits may help, but is powerless to do the whole. It can only be effected by voluntary, universal and united effort.

But for the Boer War it would have been hard—almost impossible—to convince the British public of the necessity of such action, but now the time seems ripe and the whole country appears to be ready to participate in combined action to remedy the existing evils. The invasion of Germany by the Armies of Napoleon the First taught it the necessity for the universal service which enabled her to inflict upon France such a crushing defeat under Napoleon the Third. We hope that compulsory service may not become necessary in England, but if we are to avoid conscription we must take measures to raise the physical standard of that class from which our recruits are drawn. If such measures are successfully carried out, then not the lowest class alone, but every class will participate in the benefit resulting from them, and the Boer War may ultimately prove a blessing in disguise.

Many Societies are working now for the improvement of the people and the welfare of the country, but it has been felt for some time by persons interested in the subject that universal co-operation throughout the whole country was absolutely necessary for the successful attainment of the objects in view. After several preliminary meetings I gave a dinner at the Athenæum Club in London on July 20th, 1903, a few days after the Earl of Meath and the Bishop of Ripon had spoken in the House of Lords.

There were present representatives of both Houses of Parliament,

* Report, Vol. i, p. 93, pars. 425 and 426.

the Church, Education, Medicine, and last but not least, of the Press, both lay and medical.

I laid a draft scheme of a proposed National League before them for consideration and discussion. This draft scheme was afterwards printed in the *Manchester Guardian* of July 23rd, 1903. Along with it appeared—by mistake—a list of names suggested as likely to join the League, but not intended for publication, as many of those named in it had not been communicated with. Since then the draft scheme has been under consideration, and it now is, as follows :—

PROPOSED NATIONAL LEAGUE FOR PHYSICAL EDUCATION.

DRAFT SCHEME FOR CONSIDERATION.

The objects of the proposed league are—

1. To co-ordinate the various agencies which are at present working independently of each other for the advancement of physical training.
2. To supply the information and assistance required to complete the work:

For these purposes it is proposed to unite all the bodies and individuals interested in the subject as members of one league, with an executive body consisting of president, vice-president, and council.

It has been suggested that possibly H.R.H. the Prince of Wales, who has shown great interest in physical training, might become President.

Vice-presidents might be found amongst the members of both Houses of Legislature and others interested in the subject.

Several names were suggested :—

- in the House of Lords ;
- in the House of Commons ;
- in the Law ;
- in the Education Department ;
- in the Medical Profession ; and
- in the Press : Editors of chief journals.

[In the original draft scheme a number of names were given, but they were not intended for publication, and appeared in *The Manchester Guardian* by mistake, and without the consent of those named. They have therefore been omitted in this reprint.—L. B.]

Council: This must necessarily be very large, and out of it an executive council may be chosen. It should include clergymen, mayors of towns, chairmen of county councils, heads of schools of all sorts, town or country gymnasia, secretaries of cricket clubs, football clubs, cadet corps, boys' brigades, Church brigade, lads' drill associations, rifle clubs, girls' clubs, lecture associations, temperance associations, and, last but not least, all editors of papers of every shade of political opinion, religious papers, papers for children, for boys, and for girls, and writers of books for children and youth.

SUGGESTIONS FOR CONSIDERATION.

I.—A. Before the various bodies or individuals who are trying independently to promote physical education can work together each must know what the others are doing.

1. A list should therefore be prepared of all these bodies, giving very shortly their names, localities, numbers, kind of action, and names of secretaries.

2. A monthly or weekly paper should be started to give information regarding appointments or changes, and form a means of communication. It might be called the "Physical Education News."

3. A larger publication might possibly be advantageous for longer papers on important topics. This might appear quarterly or monthly, and be called the "Physical Education Review."

B. The co-ordination of the various bodies might be of two kinds, (1) generic, and (2) territorial,

1. All bodies of the same kind, schools, continuation classes, gymnasia, cadets, and volunteers, might learn from the "News" what others engaged in the same pursuits were doing, so that any improvement made by one body could be adopted by others and arrangements made for occasional meetings or contests.

2. The different bodies in each district, *i.e.*, the schools, young

men's associations, schools for cookery and housework, girls' clubs, rifle clubs, volunteers, &c., might learn to work together and to co-operate with those of adjacent districts.

II.—The information wanted to complete the work may be obtained partly by voluntary effort, but more easily by Royal Commissions on the Housing of the Poor, on Intemperance, on the Hours of Labour amongst Children. Some of these have already reported, and that which is now proposed on the Causes of Physical Deterioration generally may report especially in reference to the hours of work in schools, the accommodation for play, the time for play, and the physical training of children, not only by exercises but by games to develop their bodies, along with a certain proportion of drill to increase their powers of attention and prompt action. The assistance needed would require to be of many kinds, *e.g.*—

To have the law so altered that the children should have shorter hours of work, and that their work should not be continuously mental. Every hour of study should be shortened to 45 minutes, which I believe to be the rule in Germany, or 40 minutes, which I believe to be the rule in Sweden. During this 15 or 20 minutes in each hour the windows might be thrown open and the room ventilated while the children play or have exercises, or have drill outside.

To provide playgrounds and playrooms under cover for the children.

To provide the necessary instructors for physical exercises.

It might be requisite to provide meals at school at a low charge, and in some instances free, in order that children underfed at home might be able to do their lessons or exercises, or even to play properly.

The provision of cheap meals at schools would also be useful as affording larger opportunities for teaching cooking to the girls attending school than they could possibly have if no such meals were provided.

In cases where the mothers cooked badly the children might be allowed to buy food at school, for the purpose of taking home, at such a price as would fully remunerate the school and yet be cheaper for the mother than what she could prepare at home.

Classes for cookery amongst mothers might also be held, but in any case the girls at school, who will be the mothers of the next generation, will learn to cook.

Instruction should be given to all children, and especially to girls, regarding the nature and digestibility of foods and the general laws of hygiene, in relation especially to fresh air, clothing, abuse of stimulants (tea or alcohol), and avoidance of infection.

Provision requires to be made for places where girls and lads who have left school and are employed during the greater part of the day in various trades may spend their spare time with enjoyment and profit to themselves instead of wandering round the streets and getting into mischief.

For this purpose girls' clubs and boys' drill halls appear to be useful, but their use requires to be greatly extended. If proper arrangements were made for this purpose, the numerous premature marriages, which tend to increase a weakly population, might be lessened, and the infant mortality would be diminished by the greater ability of the mother to suckle her infant, and her increased knowledge of how to feed it afterwards.

It is obvious to carry out the various schemes already mentioned, as well as many others connected with physical education, a great deal may be done by Royal Commissions and Acts of Parliament, but it is almost impossible that they can do it all, and in order to obtain physical improvement in all classes to the desired extent, all classes in the nation must co-operate, and for this reason it is desirable to form a National Physical Education League.—[LAUDER BRUNTON.]

Anyone who takes the trouble to compare this draft scheme with the recommendations of the Inter-departmental Committee will see that the recommendations of the Committee are practically the same as the objects which the League has proposed to carry out, and the lessening of overcrowding, regulation of hours of labour, of juvenile smoking and adult intoxication would come within the scope of changes in, or additions to, existing laws which the League proposes to initiate.

The scope of the League is so great that the work of organising it must necessarily be very slow and imperfect, especially at first. On

this account it has not yet been brought definitely before the public, and the time which has elapsed since it was initiated in July, 1903, has been spent in securing the support of men of all classes. As the purposes of the League are closely connected with medicine, it was thought advisable to have it strongly backed by medical men before other classes of the community were asked to join, because most of them are less able to judge of its merits or demerits than medical men, and would consequently be guided to a great extent by the medical profession in their attitude towards it. One of the first to join the League was Sir William Turner, K.C.B., President of the General Medical Council, and Principal of the University of Edinburgh. His example was quickly followed, and now with very few exceptions the heads of the medical corporations and many of the most distinguished men in the medical profession have joined the League, as well as the President and the Ex-President of the British Medical Association, and the Editors of the two most important Medical journals. No general canvass has been made as yet, and personal appeals have only been made to a few of those known to be interested in such matters, but even now the League has received the support of the Church, as represented by the Archbishop of Canterbury, the Archbishop of York, and several Bishops, amongst whom the Bishop of Ripon has exhibited a specially warm interest in the movement, and had worked hard to forward it.

It is intended that the League shall be kept entirely apart from all questions of religion, sect, profession or politics, and that its aims shall simply be those already mentioned in the draft scheme. In accordance with this plan the Chief Rabbi has promised his support, and it is hoped that shortly many of the most important divines belonging to other denominations will also join the League. Amongst others who have promised to act as Vice-Presidents the Law is represented by the Lord Chief Justice, the Attorney-General and some of His Majesty's judges; Science by the President of the Royal Society, the Ex-President of the British Association and other distinguished men; Education by Sir Henry Craik, K.C.B., Secretary of the Education Department of Scotland, Dr. Warre, Headmaster of Eton and several masters of public schools. Several Members, both of the House of Lords and the House of Commons

have joined, but no attempt has yet been to bring the proposal before more than a few Members of either House, and this has yet to be done, as well as application made to the Mayors and Municipalities of towns, and others whose co-operation is desired.

In order that all the agencies working for the good of the people throughout the country should be brought into relationship with the League and with one another, a list of those in London and some of those in country towns has been prepared through the kindness of Mr. C. S. Loch, of the Charity Organization Society, but these are so numerous that the list at present is very incomplete, and can only be regarded as a nucleus for a better one to be subsequently prepared. As yet it has been impossible to communicate with more than a very few, and the time and labour involved in bringing all into relationship will be very great. It will greatly facilitate the work, however, if the Secretaries of all Societies, Associations, Clubs, or Corps, whose work would come within the scope of the League, and who would be willing to become associated with it, would send their names, addresses and account of the work they are doing to the Interim Secretary, N.L.P.E.I., 10, Stratford Place, London, W.

It has not yet been decided when to bring the proposed National League definitely before the public, but it is hoped that before the end of the present year its organisation will be sufficiently complete to allow this to be done by holding a public meeting, at which the object of the League shall be set forth, officers nominated and subscriptions invited.* If one may be allowed to judge from the reception which the proposed League has met with from those who have already been asked to join, it will shortly spread over the length and breadth of the land, and number amongst its supporters every class from the lowest to the highest. But the dreary doubt may occur to many a one, "Is it possible to improve the lowest classes with no physical strength and no mental backbone?" Perhaps indeed this doubt may be felt most keenly by those who have already tried to help their poorer brethren and have been foiled again and again by the carelessness, inertness, laziness, stupidity, folly

*The National League for Physical Education and Improvement was formally inaugurated at the Mansion House, the Lord Mayor presiding, on 28th June, 1905.

and ingratitude with which their efforts have been met until they have come to the conclusion that the only way to mend such people is to re-make them. Of course this is impossible as far as individuals are concerned, but is it possible for the race? According to the evidence given before the Inter-departmental Committee, the answer is an emphatic "Yes." The sins of the fathers are visited on the children, but with the exception of actual disease and perhaps intoxication in the parents, infants are not affected before birth, but come into the world healthy and strong. It is after their birth that the unfavourable influences begin to tell, improper food, partial starvation, and lack of care in infancy; the same bad conditions along with impure air, want of exercise and playgrounds; evil companionship in the gutters during childhood; smoking, drinking, gambling, idleness, and all the bad habits which tend to form the loafer or the larrikin during adolescence and youth. According to evidence given before the Committee, there is a physical standard which is the inheritance of the people as a whole*, and although the baby's father's and mother may have become puny and weak from poverty and unwholesome surroundings, the baby when born reverts to the racial type, and if properly cared for after birth, may possibly rival in energy, enterprise, strength and physique its far-away Viking ancestors. With such possibilities lying before us, it is well worth while for every man, woman and child in the country, to strive long, strive hard, and to strive together for the common weal.

* Report of Committee, Vol. i, p. 8, par. 43.

ON THE PHYSIOLOGICAL BASIS OF PHYSICAL EDUCATION.

AN ADDRESS TO INSPECTORS OF SCHOOLS AT THE SOUTH-
WESTERN POLYTECHNIC, CHELSEA, ON APRIL 25, 1905.

By Invitation of Colonel G. MALCOLM FOX.

By Sir LAUDER BRUNTON, M.D., D.Sc., LL.D. Edin., LL.D. Aber.,
F.R.C.P., F.R.S.

Consulting Physician to St. Bartholomew's Hospital.

GENTLEMEN,—It is probable that at one time or another every one of you has seen on the sea beach after a storm a number of shapeless and useless masses of dirty jelly, disgusting to look at and still more so to tread upon. Yet those shapeless masses when floating in sea-water were delicately tinted, shapely, and graceful organisms. But they were only capable of retaining their beauty under certain very favourable conditions, and when thrown out of the water they had no power of preserving their shape. If you could overcome your disgust sufficiently to lift one of them up and put it in a pot, it would take the shape of the pot, whatever that might be. I think it is a prison chaplain, the Rev. Mr. Horsley, who has said that there are moral as well as physical jellyfish, men and women who would be very good if their environment were such as to make them good, and bad if their environment were bad. They are perfectly well behaved in prison, but it is absolutely hopeless to reclaim them and they lapse at once into their usual criminal ways on being released. Others, again, are more difficult to deal with, not so amenable to good influences, but if they are improved the improvement remains permanent. The first are moral jellyfishes, the latter are moral vertebrates. Without a backbone, physical or moral, no creatures can ever rise high in the scale of existence, and to develop backbone, moral as well as physical, is one of the great objects of Education.

In the process of evolution it would seem as if some creatures had tried to gain strength by putting a rigid skeleton outside them, but this does not allow of expansion. Crabs

may shed their shell from time to time and grow to a considerable size, and ants may evince a great amount of intelligence, but all creatures with an external shell are limited in their growth, both bodily and mentally. The highest members of the mollusc tribe, the cuttle fish, have got what we may term a backbone, but it has no joints, and they remain far down in the scale. In order to rise, we require a skeleton which shall not only be internal but capable of flexion and extension, and this we find in the vertebrates. In the backbone which supports the trunk a certain amount of movement in all directions is required, combined with great strength, and this is attained by its being composed of numerous bones firmly tied together by ligaments and acted upon by powerful muscles. The movement between any two of them is slight, yet the movement of the whole series is considerable. In the extremities we require freer movements, and this is attained by having long bones. In the arms and thighs there is a single bone, but in the forearms and legs, which support the feet and hands, a rotatory movement is required, combined with stiffness, and this is attained by having two bones, one of which moves rigidly whilst the other can rotate. In the hands and feet we again find numerous small bones to allow of free movement combined with strength. These bones are moved upon one another by muscles which have the power of contracting and relaxing. It is evident that in the struggle for existence rapidity of action is of great importance, and if three or four boys were all picking at once from the same blackberry bush, it is evident that the one who could move his hand quickest from the bush to his mouth would get the most blackberries. Such an action as this is obtained in the body by having muscles which pass over more than one joint. To take, for example, that well-known muscle, the biceps. We find that it passes over both the shoulder and elbow joint, and that it is inserted into one of the bones of the arm—the radius—in such a way that it tends to turn the palm of the hand upwards, so that, supposing a boy to have got a blackberry, the biceps tends to bring his hand into the right position to go to the mouth, to bend the hand on the forearm, and the forearm on the body, the very movements that are

required to bring the blackberry quickly to his mouth. It is astonishing to find how many muscles are combined in the simplest movement. Get someone to hold your forefinger or middle finger stiffly extended and try to bend it against the resistance which he affords. At the same time put your hand upon your own arm and you will feel that not only the muscles of the forearm but the biceps and even the muscles of the front of the chest are all contracting in order to bring about flexion of the finger. The same thing occurs all over the body, and in the act of standing, a great number of muscles indeed are involved, many of which pass over two or more joints. Their contraction is co-ordinated by the nerve centres in the spinal cord, the ganglia at the base of the brain and the brain itself. Some acts occur without our consciousness and with great rapidity. For example, when anything touches the eye or even comes near it, the eyelids shut for the purpose of defence, and this occurs very quickly indeed. The nervous mechanism by which some simple actions necessary to life are performed appear to be present at birth, and a child when put to the breast will immediately begin to suck. Among birds, complex movements like running and pecking are performed as soon as the chick emerges from the egg. But in man, complex actions such as those of walking and speaking are acquired slowly and with difficulty. The impulses which pass from the organs of sense, such as the eye or ear, appear to go to the higher centres in the brain, and from these to be reflected down to the basal ganglia, and thence to the muscles. At first the nerve messages act slowly and imperfectly, so that the right muscles are not put into action. The child totters and stumbles when it tries to walk, and cannot articulate its words aright. Slowly the motor centres become trained and by and by the nerve channels become, as we may term it, short-circuited, so that an impulse starting from the organs of sense will produce the proper muscular response, not only without conscious thought but much more quickly than if the movements were made voluntarily. It is in the nerve centres that time is lost between the application of a stimulus and the proper muscular response. Thus about 18/100 of a second are required for simple reaction,

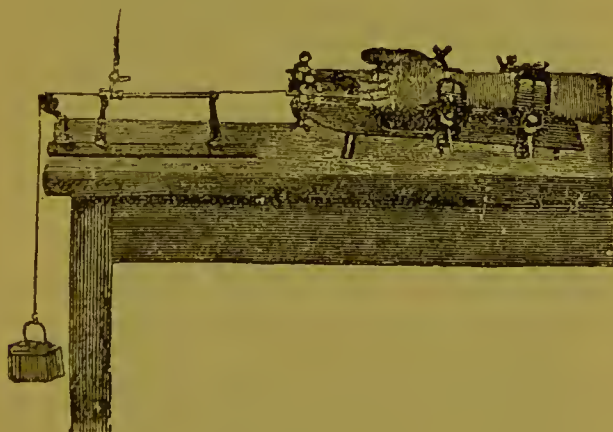
24/100 for discrimination, and 36/100 for decision. These numbers vary very much with the individual and the condition he is in. The time required, especially for decision, may be greatly lessened by constant practice, until at length the motions, which were at first very slow, very deliberate, and performed with difficulty, become easy, unconscious, and rapid, the proper action following the stimulus without the loss of a single instant. We notice how slowly short circuiting, as I have termed it, of brain paths occurs in children learning to walk or learning to speak, or in grown-up people trying to play a musical instrument, and this fact shows us that physical exercises, even of a simple character, are not at first, by any means, simply bodily exercises. They are mental exercises as well, and learning them is a considerable strain upon the brain as well as upon the muscles. By and by, as they become more familiar, the mental strain becomes less and less, until they are done automatically without any mental exertion whatever.

Now throughout the body, wherever we have a set of muscles, we have also another set possessing an opposing action. If I stand before you with my arms hanging by my side you cannot tell whether they are simply hanging loose or whether I am exerting in them all the muscular force of which I am capable, by putting at the same time the extensors and flexors on the stretch. If I do this the limbs remain motionless but the muscles are contracting powerfully and will soon become exhausted. It is obvious that for rapid muscular movement it is important that as one set of muscles contracts, the opposing muscles should relax, and Professor Sherrington has shown that the same nervous stimulus which causes contraction of one group of muscles produces also relaxation of the opponents. To this power of relaxing muscles or stopping movements the term of inhibition is usually applied and upon the power of keeping the muscles perfectly lax great stress has been laid both by Mr. Eustace Miles in this country and by the professors of ju-jitsu in Japan. When the contractile power of muscles is unduly developed it would appear that their power of relaxing becomes diminished and thus they become unfitted for rapid movements, although they may be

able to exert enormous power at a slow rate. If you will compare the statues of the Farnese Hercules and of the Apollo Belvedere or the Borghese athlete, you will readily understand what I mean, and it seems to me that what we wish to develop in the rising generation is not the heavy muscle-bound frame of the Hercules but the light, strong and yet pliant and active physique of the Apollo. Fancy Hercules trying to play the favourite games of England; he might be very formidable in the football field, but he would be completely useless at cricket, whilst Apollo would be a good man all round.

Now all exertion is followed after a while by fatigue, and this fatigue is of two kinds, (*a*) muscular and (*b*) nervous, and the nervous fatigue usually comes first. A child learning to write becomes tired long before the muscles of its fingers are really wearied and the same is the case with all movements until they have been thoroughly learned. Exhaustion of the muscles themselves, however, can bring on fatigue even when the nerve centres are not concerned at all, and this fatigue will increase until at length the muscles will not respond at all. This has been worked out very fully by my friend, Professor A. Mosso, by means of an instrument which he calls his ergograph (Fig. 1). This consists practically of a weight

FIG. 1.

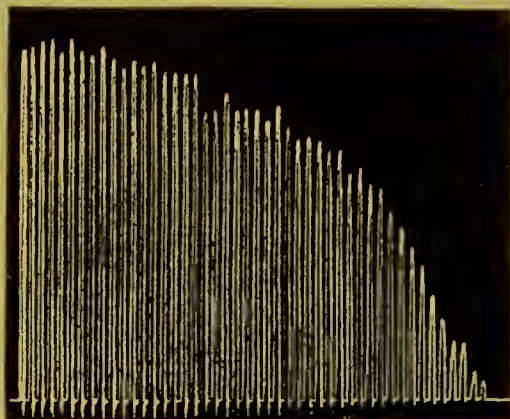


Mosso's Ergograph.

suspended from a cord which runs over a pulley. The weight is drawn up by the rapid contraction of a finger and each contraction is recorded upon a revolving cylinder. The amount of

contraction is shown by the height of the curve traced, and it is found that after a while the contractions become less and less until they cease altogether. The curves (Fig. 2) show

FIG. 2.



After Mosso. Exhaustion curve of finger in healthy man from voluntary movement.

exhaustion of the finger in a healthy man from voluntary movement. Fig. 3 shows exhaustion where the muscles were

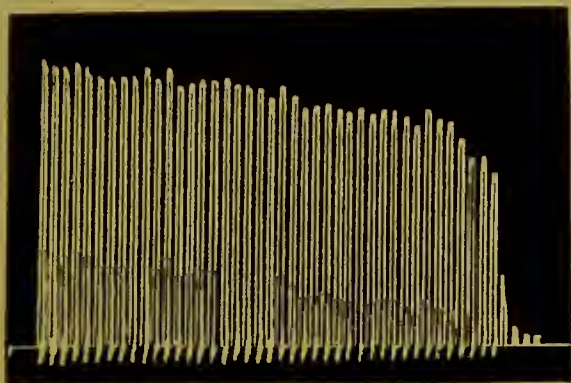
FIG. 3.



After Mosso. Exhaustion curve of finger in healthy man where the muscles are caused to contract by electrical stimulation.

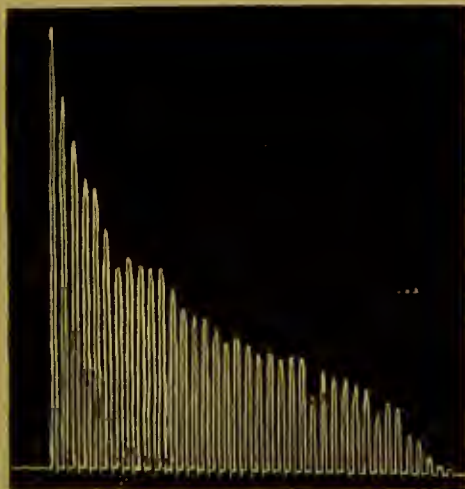
caused to contract by electrical stimulation. In some persons the power of will appears to make the muscles contract for a length of time almost up to their maximum and then they stop suddenly (Fig. 4), while in others the failure is gradual (Fig. 5).

FIG. 4.



After Mosso. Tracing from Dr. Patrizi, showing long-continued movement and abrupt failure.

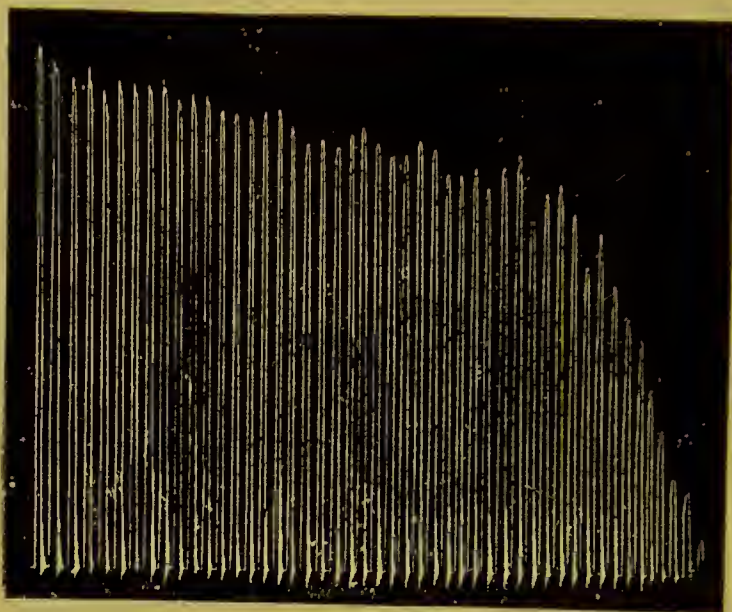
FIG. 5.



After Mosso. Tracing from Dr. Maggiora, showing rapid but gradual failure from fatigue.

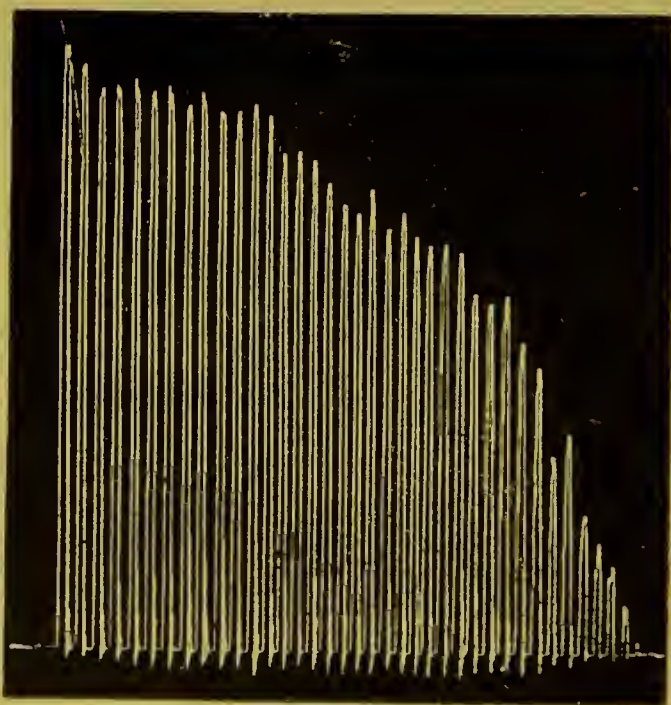
Now mental work also causes muscular fatigue. Fig. 6 shows a normal tracing, and in Fig. 7 you will notice that the contraction of the finger in the same man ceases much more quickly when he was fatigued by giving a lecture. In the first part of Fig. 8 the tracing is normal, whilst the second

FIG. 6.



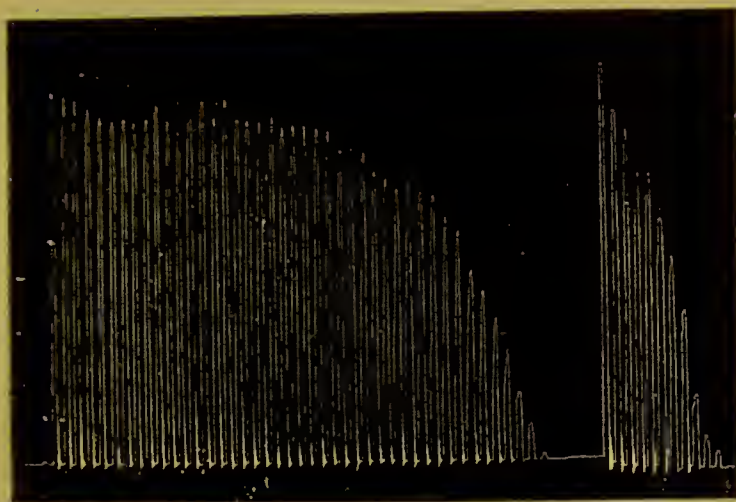
After Mosso. Normal tracing from Dr. Maggiora.

FIG. 7.



After Mosso. Tracing from Dr. Maggiora, when fatigued by giving a lecture.

FIG. 8.



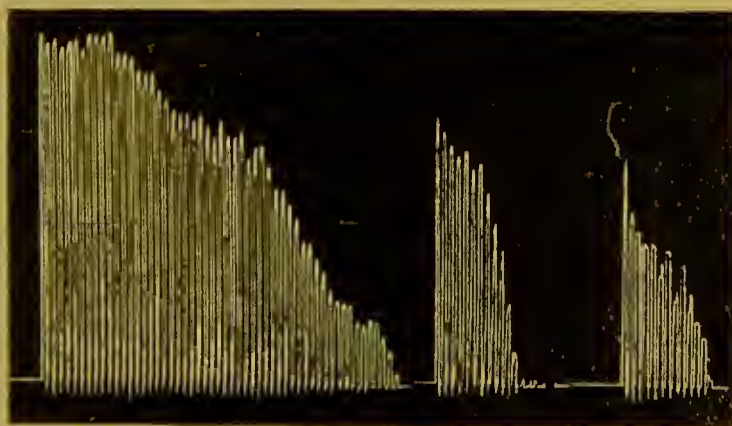
A

B

After Mosso. Voluntary contraction. A, Before conducting an examination.
B, After examining nineteen candidates.

part, where exhaustion comes on exceedingly rapidly, was taken from the same professor after examining a number of candidates. In this figure the contractions were voluntary and one might, therefore, suppose that the brain was exhausted and not the muscles, but the next figure (Fig. 9) shows that brain work will

FIG. 9.



A

B

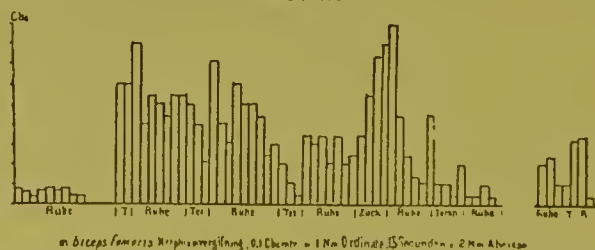
C

After Mosso. Exhaustion curve from electrical stimulation. A, before examination. B, Immediately after examination. C, Two hours after close of examination.

bring on muscular fatigue, that is to say will bring on changes in the muscles themselves which lessen their contractile power, for the curves shown in it were obtained by electrical stimulation of the muscles of the finger in which the nervous system took no part. Yet the first part of the curve shows normal endurance, whilst rapid exhaustion occurred in the second, which was taken immediately after examining candidates and the third, which was taken two hours after the close of the examination, shows even more exhaustion of the muscle as the contractions are lower.

There are three ways in which a fire can be put out. First by failing to supply it with fuel; secondly, by smothering it in ashes; and thirdly, by both combined. The way to keep a good fire is to put on plenty of fuel, and to apply the poker so as freely to remove the ash. The same is the case with muscle. Exhaustion in it depends partly upon want of fresh material, but to a much greater extent on the accumulation of what may be called muscular ash. Fresh material is brought and waste products are removed by the blood which circulates through the muscle, and nature has made provision for keeping up exertion by causing the vessels in the muscle to dilate when the muscle is active, so that much more blood flows through it than when it is at rest. It was shown by Ludwig and Sadler that during actual contraction the flow of blood through the muscle may be lessened by the compression of its blood vessels by the contracting muscular fibres, but during the interval between the contractions the amount of blood which passes through the vessels is greatly increased. This is shown by Fig. 10, where

FIG. 10.



After Ludwig and Sadler. The marks along the base lines indicate seconds; the height above the base line indicates the amount of blood flowing from the veins of the biceps of a dog during tetanus (T or tet), during rest (Ruhe), or during simple contraction (Zuck.).

the height above the base line indicates the quantity of blood passing through the blood vessels of a muscle in five seconds.

But the muscle is not nourished directly by the blood in the vessels. The muscular fibres take their food and pour out their waste into the muscle-juice or lymph which bathes them, and each muscular contraction tends to renew this. For the muscles are surrounded by a strong fibrous sheath or fascia, and between this and the muscle is a space in which this lymph is present (Fig. 11). When the muscle contracts it squeezes the lymph

FIG. 11.

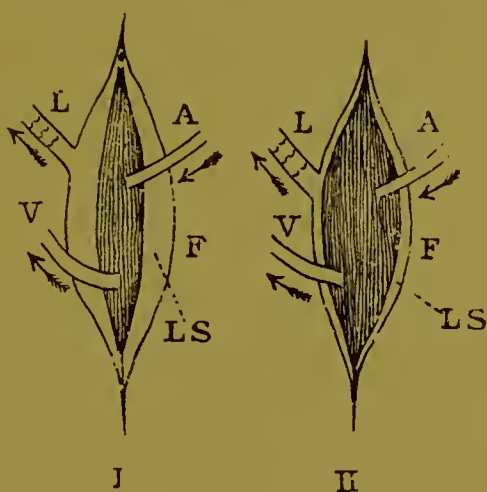


Diagram of longitudinal sections of muscles, I in relaxation and II in contraction. F is the fibrous fascia or sheath of the muscle. LS a lymph space between the muscle and the outer layer of fascia. L is a lymphatic vessel with numerous valves, by which the lymph containing waste products is removed. A is an artery by which fresh blood is brought to the muscle; and V is a vein by which blood is removed from it. Each time the muscle contracts, as in II, it lessens the size of the lymph space and drives the lymph onward through the lymphatics. Each time it relaxes it tends to create a vacuum within the fascia, and thus lymph is sucked out of the muscle into the lymph space, while fresh arterial blood rushes into the muscle.

out, and when it relaxes it tends to cause a vacuum in the sheath, and thus draws the lymph out of the muscle into the space. From this it is again ejected by the next contraction into the lymphatic vessels, and its return is prevented by the numerous valves with which they are furnished. In this way we have a regular pumping action, each contraction of the

muscle driving the blood and lymph onward, and each relaxation drawing blood and lymph into it. This can be imitated artificially by massage—kneading the muscles—and this process restores contractility to the muscles after they have been exhausted. The effect of massage upon the flow of blood through the muscles is extraordinary, for Dr. Tunnicliffe and I have found that the rate of flow through the blood vessels was increased threefold by massage (Fig. 12). The extent to which

FIG. 12.

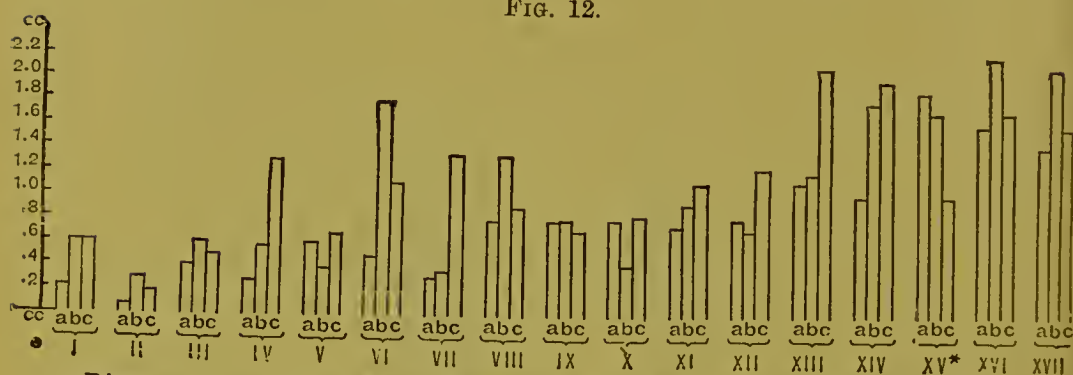
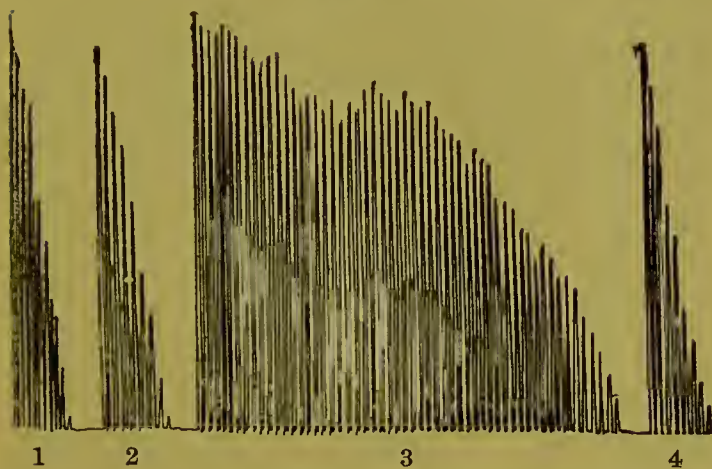


Diagram to show the effect of massage on the flow of blood through muscle ;
a, shows the amount of blood in cubic centimetres which flowed from a muscular vein when it was simply opened ; b, during massage ; c, after massage.

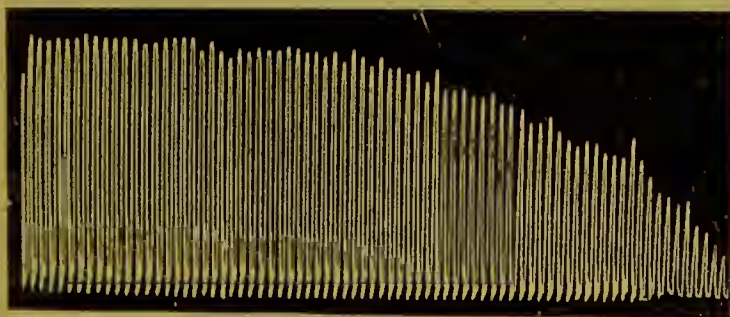
massage increases the contractility of muscles after they have been fatigued is shown by Fig. 13. It is not very easy to say what the effect of training upon muscles is, but it is certain that it greatly increases their power of resisting fatigue. This is shown by Fig. 14, which ought to be compared with Figs. 2 and 6. The effect of massage upon the muscles is to raise the blood pressure within the vessels generally, as is shown by Fig. 15, and muscular contraction either reflex or voluntary, has a similar or greater result, and causes the blood to pour more quickly from the vessels into the heart, whilst the heart, in its turn, drives the blood on more quickly through the vessels. Muscular exertion quickens the pulse, and accelerates circulation, but it is not upon the circulation alone that its effect is exerted. Respiratory movements are increased both in depth and rapidity. They not only bring more oxygen into the lungs to aerate the blood, but they have also an effect upon

FIG. 13.



After Maggiora and Vinaj. *Blät. f. Klin. : Hydrotherapie*, 1892, p. 9. 1. The fatigue curve of the left hand raising a weight of 3 kilogrammes every two seconds. 2. The fatigue curve of the right hand. 3. The fatigue curve of the left hand after five minutes' massage. 4. That of the right hand without massage.

FIG. 14.



After Mosso. Showing the effect of training, in increasing endurance as compared with Fig. 2, from the same person. Owing to a difference in the apparatus the height of the curves is not comparable. The amount of work done was really double that in Fig. 2.

the heart similar to massage upon the muscles. The respiratory movements, especially when deep, help to press the blood out of the heart and to attract blood into it. The movements of the heart itself also tend to carry on a kind of self-massage. These effects were shown by my friend, Professor Kronecker, and will be understood from the accompanying figures. The first of these (Fig. 16) shows the thorax during inspiration and during contraction of the heart. In this condition

FIG. 16.



Diagram of a transverse section of the thorax during inspiration and cardiac systole. It shows the tendency to the formation of a vacuum in the pleural and pericardial cavities.

In Fig. 15 the chest is shown during expiration and cardiac diastole, when the walls of the pleura and pericardium are pressed together and lymph is ejected into the lymphatic vessels.

FIG. 17.



Diagram of a transverse section of the chest during expiration and cardiac diastole, showing the pressure of the walls of the pleural and pericardial cavities against each other.

Exercise within bounds thus tends to increase not only nutrition of the muscles, but of the lungs and heart. But if it is carried to too great an extent the consequences are very

different. Cardiac strain tends to cause dilatation of the heart beyond its normal size, and the valves which normally close the orifices and prevent regurgitation of blood become too small and fail to act. The next figure (Fig. 18) shows the photograph of a normal heart taken by the X rays by Professor Schott, of

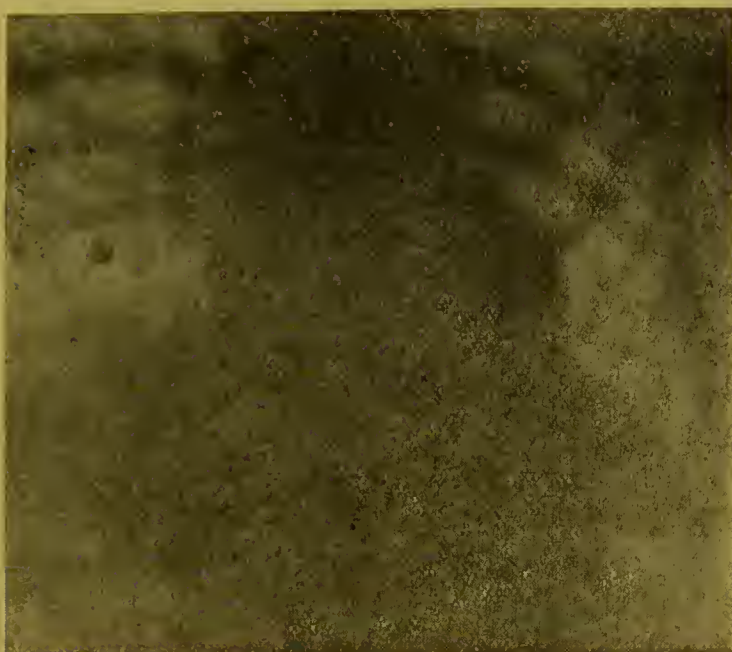
FIG. 18.



After Dr. Th. Scott. Photograph by the Röntgen rays, showing the heart in a healthy man before exertion.

Nauheim, whilst Fig. 19 shows the same heart after very violent exertion and the dilatation which the exertion has produced is quite evident. If the exertion be not very great the heart tends to resume its normal size in a short time, but if it be too long continued the heart becomes permanently strained and dilated. The consequences of this are shown in Figs. 20, 21 and 22, where the two smaller figures show a healthy heart in full contraction, one from the side and the other from above, and the large figure shows a dilated heart in which the valves are incompetent. It is evident that cardiac strain of this sort is to be carefully avoided, but what may be strain for one boy is really insufficient exercise for another and in order to get the best effects of exercise without doing any mischief to the heart, medical examination is absolutely necessary. More especially is care wanted in boys and girls who are growing rapidly because in them the tissues are soft

FIG. 19.



After Dr. Th. Schott. Skiagraph of the heart of the same man as Fig. 18, after violent exertion, showing temporary dilatation.

FIG. 20.

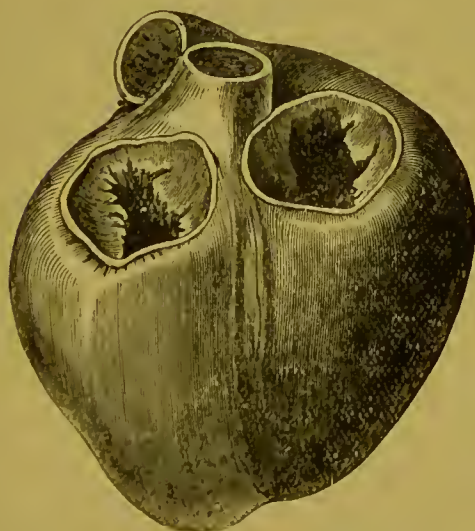


FIG. 21.



FIG. 20.—Heart fully distended, shewing insufficiency of the valves to close the mitral and tricuspid orifices (seen from the back and the auricles removed, so as to display the auriculo-ventricular orifices).

FIG. 21.—Heart in full systole, showing the mitral and tricuspid orifices so diminished by the muscular contraction that the valves close them easily (seen as in Fig. 20).

FIG. 22.



FIG. 22.—The same heart as in Fig. 21, seen from above.

and yield more readily to over strain, and in this relation, too, we must not forget what Mosso has clearly shown, Fig. 8, that mental fatigue produces muscular weakness. If a boy is doing much mental work he is unable for so much physical exertion as he would otherwise be.

The converse of this is also true to a certain extent. The brain, like the muscles, requires blood in order to perform its functions and if much blood is going to the muscles less will go to the brain (*cf.* Fig. 23). My beloved teacher, Professor Ludwig, showed that when the vessels of the muscles were dilated, as much blood could pour through them as through all the other channels taken together, and, therefore, if a boy is taking much muscular exercise, we must not expect him to do quite as much brain work. It appears that after the vessels of a muscle become dilated, it takes a little while for them to return to the normal, and when children have been running about playing it takes a little while for them to settle to their work when they come back. But this is not all lost time. During the exertion of playing not only have the vessels of the muscles become dilated but the heart has become stronger in its action, and when, a little while afterwards, the muscles have become quiet and the circulation through them is less, more blood is diverted to the brain, which thus acts more quickly, and more mental work may be done in a quarter of an hour with a good circulation than in an hour with a feeble one. The removal of waste products from the muscles continues for some time after muscular action has ceased, and increased

FIG. 23.

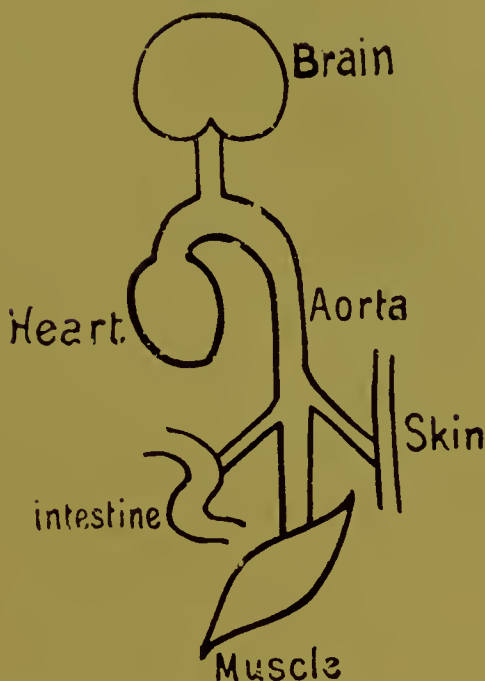


Diagram showing the four great areas for the distribution of blood in the body, viz., the muscles, the brain, the intestine and the skin.

respiration is required in order to burn these waste products completely away. If we run upstairs our hearts will beat quickly and our respiration will be short for some time after we reach the top.

It is evident that pure air ought to be supplied so that the class room to which the children return after exercise should be thoroughly ventilated while they are out and should be well ventilated also while they are in the room, care being taken to avoid draught. Fresh air does no harm, even when cold, provided it be not in the form of a draught, but there is a good deal of truth in the old saying, "If wind blow at you through a hole, make your will and sain your soul." Widely opened windows do little or no harm, even when the air is cold, as is well shown by the modern treatment of consumption, but little draughts are, I think, dangerous, especially if they impinge upon the back or side of the head. Cold air is objectionable if inhaled in the wrong way. The story of the creation of man, as given in the Book of Genesis, is "that God breathed

into man's nostrils the breath of life and he became a living soul." There is a great deal of instruction in this passage. The nostrils, and not the mouth, are the normal passage for breathing, and when people forget to breathe through their nostrils and use their mouth for the purpose, they run great risks. The nose is provided by nature with a beautiful apparatus for warming the air, something like the most modern pattern of stoves, of convoluted bones covered with mucous membrane loosely attached to them, so that blood may flow through it in large quantities whenever necessary and warm the air which passes over them. The mucous membrane is covered with cilia which are constantly working so as to eject any microbes which may settle upon them, and thus the risk of either impure air or cold air reaching the lungs themselves is reduced to a minimum so long as persons breathe through their nostrils. Whenever it is found that children cannot breathe through their nostrils but breathe through their mouths, the nose should be inspected by a medical man, and, if possible, any adenoids which obstruct the nasal passages should be removed. If I pass the air which I expire from my lungs into lime water it becomes turbid, and if I blow upon a mirror it becomes dimmed. These facts show that the air from the lungs contains carbonic acid and water vapour, the same products which issue from the funnel of a steam engine. I show you these simple experiments in order to remind you that the power exerted by the human body and by the steam engine is alike furnished by the combustion of carbon and of hydrogen. It used to be thought that the body differed from a steam engine in this respect, that whereas the steam engine only consumed the fuel that was thrown into the furnace, the body consumed its own mechanism and, in fact, burned off its own muscles. It was, therefore, considered that a large quantity of nitrogenous food was necessary for severe muscular exertion. This is now shown to be a mistake. Carbon and hydrogen are the force-yielding ingredients of animal food, though proteids containing nitrogen are necessary to supply the wear and tear of muscles just as a certain proportion of iron and brass are required to repair the wear and tear of a steam

engine. But if the carbon and hydrogen of the food be insufficient, or if the exertion be too great, wear and tear goes on in the muscles to a much greater extent than normal. The excretion of nitrogen is greatly increased, and, where food is insufficient and exertion very great, instead of the muscles becoming larger, stronger, and better adapted for exertion, they become weak and atrophied, and in order to avoid such a catastrophe, if physical exercise is to be carried on efficiently, the necessary food must be supplied. But I have already mentioned that it is not merely the muscles which become fatigued, the brain becomes fatigued as well, and just as the muscles need rest so does the brain, and an ample allowance of sleep is requisite for everyone, but more especially for growing children. The physical exercises recommended in the syllabus of the Board of Education are most useful for the purpose of exercising all the different muscles in the body for training the nerve centres in the co-ordination of simple movements. They also tend to develop the higher centres by teaching obedience to the word of command, but, as the syllabus very truly says at p. 10, it is of the first importance that adequate provision be made for such exercises as running, leaping, skipping, preferably in the form of play.

Pleasure is a most powerful stimulus to the nervous system, and I think it is of the utmost importance that physical exercises should be regarded by children rather as play than as work. It is in play, especially play with ball, that some of the highest forms of co-ordination are developed, where the eye has to watch the movement of the ball through the air, and hand, foot, and trunk must all be ready for immediate action while the brain is engaged in judging distance and supplying the movements to be performed. Games of ball are amongst the oldest of all games. We find them pictured on the tombs of the ancient Egyptians. We know from the classics how much they were practised in Greece, and we see from the cricket of the present day not only how much enjoyment they give in youth but how much exercise they induce men of maturer years to take. But play requires playgrounds, and it is not always easy to obtain these. Sometimes, indeed,

FIG. 24.



A constitutional walk. "An agreeable duty" (after Leech).—*Punch*, March, 1848, vol. xiv, p. 124. (By the kind permission of the proprietors of *Punch*.)

FIG. 25.



Croquet. "A nice game for two or more" (after Leech).—*Punch*, Aug. 17, 1861. (By the kind permission of the proprietors of *Punch*.)

FIG. 26.



Lawn Tennis. "A modern tournament" (after Du Maurier).—*Punch*, Sept. 3, 1881. (By the kind permission of the proprietors of *Punch*.)

FIG. 27.



Polo. "The lists at Hurlingham" (after Du Maurier).—*Punch*, July 24, 1886. (By the kind permission of the proprietors of *Punch*.)

it may be impossible for the educational authorities to do so, and then they must fall back upon private enterprise. It is impossible, I think, to estimate too highly the admirable work which is now being carried on by the Board of Education, but assistance from without is wanting, assistance in which every man, woman, and child in the country ought to take part. With an object of trying to ensure this an association is now being formed for physical education and improvement.* The success of this will depend very much upon the teachers throughout the country, and it is to be hoped that they will give it their most earnest support. With increased physical training we may, I think, safely expect a distinct improvement in the physique of the people generally, such as appears to have taken place in the physique of women, especially of the upper classes, within the last forty years. This is well shown by the pictures in 'Punch' which, with the kind permission of the proprietors, I show you. In the first of these you see the old-fashioned constitutional walk, in the next, croquet, in the third, lawn tennis, and in the fourth, polo (Figs. 24, 25, 26, and 27). Whether increased physical exercise can be the only cause or not of the marked increase of the size of women in late years, I cannot say, but at any rate it seems probable that it is the most important factor, and we may trust that what it has done for the upper classes it may do for the whole country.

* Since this address was delivered, this association has been formed, and is now incorporated as "The National League for Physical Education and Improvement." It is a league for the good of the nation at large, not for any class, sect, or creed, and it is therefore strictly non-political and undenominational. It is not intended to replace any association at present existing, but to establish a close connection and co-operation between all societies and individuals at present working for the physical welfare of the nation. For this purpose it will try to assist the working of organisations already in existence, and to start them where at present there are none. In order that all classes may join the League, the subscriptions vary from one guinea annually, or ten guineas for a life payment, for Fellows, to five shillings annually for Members, and one shilling a year for Associates.

Payments may be made to, and any desired information obtained from, the Secretary, 49/50, Denison House, Vauxhall Bridge Road, London, S.W. (near Victoria Station).

NOTES ON THE OBJECTS OF THE NATIONAL LEAGUE FOR PHYSICAL EDUCATION AND IMPROVEMENT.

MEMBERS of the League are often asked the questions:—

- (1) What are the objects of the League?
- (2) What do you intend to do?

The objects of the League are numerous, but for the sake of convenience they may be shortly summed up on the fingers of one hand thus—

- (1) To save the babies.
- (2) „ help the children.
- (3) „ train the youths.
- (4) „ instruct the parents.
- (5) „ lessen the drink.

The second question is, What does the League intend to do in order to attain these objects?

Before answering this question positively, it may be well to state what the League does **not** intend to do.

It does **not** intend to interfere in any way with any society which is already working for these objects.

On the contrary, it hopes to help each and all of them in the work they are already carrying on by making them known to each other, so that they can render mutual assistance and extend the good work done by those societies already in existence to other places where it is wanting.

If we compare all these societies to the bundle of sticks in the fable, which separately were easily broken but united resisted every attack, the League may be said not to be a new stick added, but to be the band that holds them together.

Having given this explanation of what the League **does**

not intend to do, we may now consider what it **does** intend to do.

(1) To save the babies. The mortality amongst children under the age of 5 is enormous, and under the age of 1 it is simply appalling. This awful mortality is due—

- (1) To the weakness of mothers.
- (2) „ ignorance of mothers.
- (3) „ carelessness of mothers.
- (4) „ imperfect milk supply.

(1) The weakness of mothers prevents them from suckling their offspring. The ignorance or carelessness of mothers makes them feed their infants on food which is unsuitable for them, and in consequence they either die, or their health is impaired and their strength enfeebled.

But even when mothers are neither ignorant nor careless they are often unable, especially in towns, to obtain pure milk, however desirous they may be of doing so.

In order to lessen the weakness of mothers, and give them a chance of suckling their children, the League desires that every woman about to become a mother should become known to it, in order that measures may be taken to give her rest—or at any rate only easy work, without strain—for at least a month before and a month after her confinement. Information of the expected confinement may be obtained either by the woman herself giving notice at the nearest office of the League, or by the medical man or midwife to whom she applies for attendance doing so. At first it would be most likely the latter; but as the League and its objects become more widely known, the woman herself would probably give the requisite information. The required rest before and after confinement might be obtained in many cases by the aid of district nurses or voluntary helpers, who would do the heavier work for the mother. In some cases, however, where the earnings of the mother form an essential part of the income of the household, it may be necessary to subsidise her. The funds for this purpose would require at first to be obtained from voluntary contributions, but later on, when the necessity of some provision of this sort becomes

known to the working classes themselves, the necessary money might be subscribed by themselves, in the same way as strike funds are maintained at present.

As soon as the expected confinement is known to the League a lady visitor in the district will be notified, and she will visit the prospective mother and give her the information required about the mother's own health, the care she should take, the risks she should avoid, and the preparation in the way of baby clothes, &c., which she ought to make, helping her if necessary, or arranging with other women of the mother's own class in life to help.

As soon as the baby is born, notice should again be given at the nearest office of the League, and again a visitor would go to the mother and give such advice and assistance as might be needed.

At Huddersfield the Mayor, Mr. Broadbent, has initiated a remarkably ingenious, generous, and successful scheme for obtaining early information of a birth by offering a reward of one shilling to the person who brings the first news of it to him. He has also put a premium on careful nourishment by offering a gift of one sovereign to each baby on its attaining the age of one year. It is to be hoped that similar generosity may be found in other large towns, and, at any rate, that immediate registration of every birth may be obtained.

It is obvious that the lady visitors who are to instruct the mothers must themselves be well instructed, and provision must be made for this either by the agency of the National Health Society, or by others.

In order to provide pure milk it is quite unnecessary for municipalities to become dairy farmers. The work they have to do is to take such measures that the purveyors shall be obliged to supply pure milk under penalty of withdrawal of the municipal licence.

There is already at Glasgow a plan followed by which milk perfectly pure can be supplied to the consumers in pure sealed bottles at a price no higher than that paid at present for ordinary milk, the increased price of transport being covered by the diminution in loss from souring. At present in order

to prevent souring, milk is either sterilized by boiling, or various so-called preservatives are added to it. The disadvantage of preservatives is that while they prevent souring they do not entirely prevent other changes occurring in the milk whereby it may become not only injurious but poisonous to human beings.

Sterilizing the milk by heating is free from this disadvantage, but it gives the milk a taste which is less pleasant than that of unboiled milk, and it destroys certain substances naturally contained in the milk which render it more easy of digestion and assimilation. Boiled milk is said to render children fed upon it more liable to rickets than children fed upon fresh milk. The plan by which pure milk is secured in Glasgow is simply the preservation by perfect cleanliness from the moment the milk leaves the cow until it is consumed. The milkman must carefully wash the cow's udder and then his own hands before milking. The milk is drawn into a perfectly clean pail from which any putrefactive germs have been removed by boiling water or steam. It is then conveyed to a perfectly clean refrigerator where it is cooled down, and it is then put into perfectly clean bottles which are sealed and are thus delivered to the consumer, so that all risk of contamination is avoided.

The risk of disease being conveyed by the milk is avoided by the cows being examined by a veterinary surgeon so as to ascertain that they are free from tuberculosis, or other disease communicable by milk, and by the milkmen being kept apart from any one who is at all likely to convey infection. The object of the League in relation to milk will be, first of all, to have a comprehensive scheme drawn up by experts for supplying pure milk and next to bring this scheme before the notice of various municipalities with the object of having it carried out. In addition to this, however, it will probably be necessary to extend the powers of medical officers of health and to obtain the sanction of the legislature to inspection and registration of farms so that the sources of the milk may be kept pure.

Another object of the League will be to further physical

education in schools. A great deal is being done in this direction by the Board of Education, but there is a want of proper training schools throughout the country sufficient to supply the increased demand for teachers of physical education. Besides, there is at present no means of securing a uniform standard of knowledge and power of instruction amongst the teachers. To obtain this it is advisable that a national institute or central institute should be formed for the purpose, first, of holding examinations and granting diplomas to qualified teachers. The training schools for physical education already existing in the country should be recognised and affiliated by this institute, but only after they have given satisfactory proof to the institute that they possess the qualifications which it may deem necessary. In order to supplement these, however, and provide instruction for larger numbers of teachers than can be met by these schools as well as to provide special courses of instruction and training in special branches not given in these schools, it is advisable to institute a large school in London. An institute of this sort has recently been opened at Dunfermline under the auspices of the Carnegie trustees. The lines upon which this school have been founded are so good that it might serve as a model for a school in London.

The question of the proper feeding of children in schools is also one that should engage the early attention of the League, and it will use its efforts to secure that school children shall be properly fed, while at the same time the burden of feeding them should be thrown on the parents and not upon the ratepayers. The extension of cookery schools and classes of cookery for mothers will form another branch of activity of the League.

Another object of the League will be to endeavour to secure universal medical examination of school children so that those who suffer from defects of the eyes, ears, or teeth, may be saved from the discomfort, pain, and even danger to life which such defects might entail if allowed to remain without attention.

The provision of playgrounds will also occupy the attention

of the League, and efforts will be made to secure them for school children both in town and country by the united action either of municipal bodies or of private individuals, or of both. Occupation and amusement for children and youths after the hours of work are over, so as to prevent any tendency to hooliganism, will also form another department. Through the efforts of the Twentieth Century League, which has now become amalgamated with the National League, the Education Department of the London County Council have given permission for children to play in the school yards after school hours, provided they are supervised by voluntary inspectors. The example thus set may be extended to other towns. The training of youths in habits of obedience and discipline will be fostered by co-ordinating and extending the system of boys' brigades, &c., and establishing similar organisations where these do not already exist.

Instruction of parents will be effected as far as possible by disseminating instructive books and pamphlets, and by lectures and demonstrations through the medium of the National Health Society. The League will try to lessen the amount of drunkenness in the country by trying to co-ordinate all the agencies at present at work for this purpose, by teaching children the evils of drink, by disseminating literature having the same object, and by providing clubs or other places of amusement from which intoxicants are excluded. They also trust that, by raising the standard of cookery throughout the country, they will lessen the craving for drink which badly-cooked and unappetising food has a tendency to excite.

They will also devote their efforts to the housing both of the working classes and of the poor by endeavouring to clear away slums and substituting for them good tenements at a moderate rent. In the country they will try to increase the house accommodation of labourers where it is at present deficient, and to improve it where it already exists. For this purpose they will try to enlist private enterprise, municipal authorities and legislative action.

The Great Question of the Day,

. . THE . .

Health of the People.

*Full Verbatim Report of the Speeches delivered
on June 28th, 1905, at the
Mansion House, the Lord Mayor presiding,*

BY

THE BISHOP OF RIPON,
THE LORD CHIEF JUSTICE,
SIR WILLIAM BROADBENT, Bt., K.C.V.O.,
ALDERMAN & SHERIFF SIR THOS. VEZEY STRONG,
MRS. BRAMWELL BOOTH,
THE RIGHT HON. R. B. HALDANE, M.P.,
SIR JAMES CRICHTON-BROWNE, M.D.,
MR. J. COMPTON RICKETT, D.L., M.P.,
and
SIR LAUDER BRUNTON, M.D.,

TO INAUGURATE
THE

**NATIONAL LEAGUE FOR PHYSICAL
EDUCATION AND IMPROVEMENT.**

OFFICES :

49-50, Denison House, Vauxhall Bridge Road, S.W.
Telephone: 1210 Victoria. (Near Victoria Station.)

PRICE ONE PENNY.

NATIONAL LEAGUE FOR Physical Education and Improvement.

OBJECTS.

1. To stimulate public interest in the Physical Condition of the People throughout the Kingdom.
 2. To establish close Association and Centralisation of all Societies and individuals trying to combat such influences as tend to produce National Physical Deterioration.
 3. To aid existing Organisations.
 4. To start Organisations for Physical Health and well-being wherever none exists.
-

This Movement will be on strictly non-political and undenominational lines.

The day following the Meeting at the Mansion-house, the speeches at which are given here, another was held at the Cannon-street Hotel, where some thirty representatives of Societies wishing to associate themselves in the work approved by the great gathering under the Chairmanship of the Lord Mayor, met the provisional Executive Council, and the following resolutions were passed unanimously:—

That this Conference representing Societies interested in and working for the Health of the Nation agrees to a Federation between those Societies with the Council of the National League for Physical Education and Improvement on the principle of proportional representation.

That the present Executive hold office for one year, and that in succeeding years the Executive be elected at an Annual Meeting of the Council.

Many Societies were unable to send representatives, owing to the unavoidable shortness of notice.

With these, negotiations will be opened at once, and any into whose hands this may fall are requested to communicate with the Secretary,

49-50, DENISON HOUSE,

VAUXHALL BRIDGE ROAD,

(Near Victoria Station.) S. W.

Telephone: 1210 VICTORIA,

The Executive body, which thus holds office for a year for the purpose of organizing the League, consists of the following persons, who were originally chosen at a large gathering at the Athenæum Club, on March 30th, 1905, at which representatives of various religious bodies and members of all professions were present.

Provisional Executive Council.

THE BISHOP OF RIPON (*Chairman*).

SIR WILLIAM BROADBENT, Bart., K.C.V.O.

SIR WILLIAM TURNER, K.C.B., D.C.L., LL.D., F.R.S., &c.

T. S. CLOUSTON, M.D., F.R.S.E., &c.

ANDREW CLARK, F.R.C.S.

SIR J. BATTY TUKE, M.D., D.Sc., LL.D., F.R.S.E.

PROF. HOWARD MARSH, F.R.C.S.

H. T. BUTLIN, D.C.L., F.R.C.S.

SIR J. CRICHTON-BROWNE, M.D., LL.D., F.R.S.

SIR HUGH R. BEEVOR, Bart., M.D.

SIR LAUDER BRUNTON, M.D., D.Sc., LL.D., F.R.S.

PROF. CATON, M.D.

WILLIAM HALL, M.R.C.S.

ROBERT JONES, M.D.

PROF. T. OLIVER, M.D., F.R.C.P.

HENRY ASHBY, M.D., F.R.C.P.

THE BISHOP OF BRISTOL.

THE BISHOP OF HEREFORD.

REV. H. RUSSELL WAKEFIELD, M.A.

COMMISSIONER T. H. HOWARD, of the Salvation Army.

MAJ.-GEN. SIR FREDERICK MAURICE, K.C.B.

SIR J. MACDONELL, C.B., LL.D.

LORD STORMONTH DARLING.

THE LORD MAYOR OF LONDON.

SIR HENRY CRAIK, K.C.B.

Provisional Executive Council (Continued).

RT. HON. SIR J. E. GORST, P.C., M.P.

T. J. MACNAMARA, LL.D., M.P.

REV. EDMOND WARRE, C.B., D.D.

J. B. ATKINS.

SIR BENJAMIN BAKER, K.C.B.

SIR ARCHIBALD GEIKIE, D.C.L., LL.D., F.R.S.

RT. HON. LORD GEORGE HAMILTON, M.P.

J. COMPTON RICKETT, M.P.

R. A. YERBURGH, M.P.

SIR ERNEST CLARKE.

COL. CRUDEN.

COL. T. H. HENDLEY, C.I.E., I.M.S. (retired).

E. H. POOLEY, late Secretary to the Departmental Committee
on Physical Deterioration.

C. B. FRY, B.A.

EUSTACE MILES, M.A.

J. E. K. STUDD.

PELHAM WARNER.

ALFRED HOARE, HON. TREASURER.

J. E. WALKER, HON. SOLICITOR.

BEVERLEY HALLEY, SECRETARY,

49-50, DENISON HOUSE,

VAUXHALL BRIDGE ROAD, S.W.

[Reported by a member of
The Times Staff.]

NATIONAL LEAGUE FOR PHYSICAL EDUCATION AND IMPROVEMENT.

A MEETING to inaugurate the above League was held at the Mansion-house on Wednesday, June 28, 1905, the LORD MAYOR presiding. There was a large attendance.

The CHAIRMAN said,—My Lord Bishop, my Lords, Ladies, and Gentlemen,—I see that I am down on the programme to open the proceedings, which I do with a great deal of pleasure, and I congratulate you all on being present to hear, as I am sure you will, something very interesting. I will now ask the Right Rev. the Bishop of Ripon to move the first resolution.

The BISHOP of RIPON.—My Lord Mayor, Ladies, and Gentlemen,—I have been asked to propose the following resolution :—
“ That the causes which tend to impair the health of the nation as disclosed by the report of the departmental committee ought to be combated by united action. It is, therefore, recommended that all the agencies at present engaged in isolated work for that purpose should have the opportunity of combining, and thus cover the whole country.” The wording of that resolution will, I hope, disarm the suspicions and the fears of many who are interested in those wonderfully useful isolated agencies which, all over the country, have been doing such excellent work both now and heretofore. (Hear, hear.) The resolution calls our attention not to any controverted point ; it does not strive

to raise the question whether there has been an actual deterioration in physique and natural power of the race during a given number of years, but it merely reminds us that there are tendencies and conditions at work which certainly tend to injure the physical strength of the people. And hence, I would ask you, as I have asked myself, to set aside all the questions which may have been debated in a very interesting way respecting the probable deterioration of the race. We are engaged in a much more practical work than examining in a curious fashion what is the difference between our condition to-day and in the times gone by. We rather are asked to fasten our attention upon certain conditions which, by all admission, are not calculated to improve the health of the people. Now, we are thrown back upon the interdepartmental committee's report in order to assure ourselves that these conditions do exist. We are not here, therefore, to debate a question which is doubtful, but rather to take action, if we can, upon a report which was conducted with a great deal of impartiality of investigation and which, I think, was constituted—the members of which were gathered together with a determination to have no prejudgment of the case, but that all the facts which might be investigated should be investigated with the strictest indifference, as it were, to results. Now, the result of that report has been to point out to us that there are certain conditions at work which, at any rate, are not creditable to a civilized community. Such and such legislation is recommended. Further, we are reminded in the report that great powers exist in the hands of corporations and municipal bodies throughout the country, which powers, if put into operation, might do a great deal to secure the healthy up-bringing of the children and the protection of the population at large from those conditions which make for physical deterioration. (Hear, hear.) We are reminded that still-births ought to be registered, we are reminded that infant mortality is still very great—in fact, my Lord Mayor, it does seem to me to be one of the significant facts which surely demand investigation and consideration that, whereas in the last 50 years immense strides have been made towards the improvement of the health of the people—while immense strides have been made towards the improvement of their dwellings, while during that period the average length of life has been greatly increased—yet it remains still true that the percentage of infant mortality has not sensibly improved at all. There are places, too, in which the infant mortality is

so great that we feel conditions inimical to life must surely be at work in those centres. If I may follow the statistics which have been laid down by certain authorities, the number of deaths under a year per thousand amongst children was 154 in the decade from 1851 to 1860, and it was 154 in the decade from 1891 to 1900. That is to say, it was stationary over the country, notwithstanding the great advance and improvement which has been made in other directions. The benefits of our civilization have come to the adult, they have not come to the child. In the last 30 years the population has slowly migrated from the country to the town. Whereas half the population were situated in the happy conditions of country life 30 years ago, now three-quarters of the population are centred in the towns. In other words, there has been a passing over of one-quarter of the population from the country to the town. And when you examine these statistics—the statistics of infant mortality in the large towns—you immediately feel that there are conditions at large tending to check the development and preservation of infant life. I take, for argument sake, statistics of a doctor who has taken considerable trouble in the subject, and these show that if you classified the towns—the favoured towns and the ill-favoured towns—towns in which, that is to say, married women go largely to work in the mills with towns where, as a general rule, married women do not work, you have this result—that the infant mortality rose from 100 to 127. In other words, you had 25 per cent. more deaths in the towns where women were at work than in the better favoured towns. Now these things seem to me to constitute quite a sufficient number of facts, and they could be enlarged almost indefinitely, to warrant our saying what we do in the words of the resolution—that the inter-departmental committee's report has shown us that conditions exist which ought to be attended to if we desire that the health of the population shall be sturdy, robust, and vigorous as it ought to be. (Cheers.) But I want for a moment to ask you, my Lord Mayor, and you, my lords, ladies, and gentlemen, whether it is not a fact that the awakened interest in this question is not largely due to the devoted labours of those various people and those various agencies which, during the last 50 years, have been toiling to better the conditions of our fellow-countrymen. (Hear, hear.) You all know that, and it would be tedious to recite a list of those societies and the names of those noble men

and women who have done so much not merely to awaken public attention, but to do something practical to stem the tide which is causing such injury to health. You have had those who have worked to improve the dwellings of the poor, you have had those who have worked for the better administration of our hospital system—there have been those, and hundreds of societies like them, that have done admirable work. (Cheers.) They have quickened the conscience of the nation and made it possible for the public interest which exists to-day to come into being. (Hear, hear.) For, I take it, our interest to-day is not due to this—that we are better than our fathers—but that our fathers and our brethren during the last 40 and 50 years have been showing us what should be done and what can be done. (Cheers.) Our feeling, I imagine, to-day is this—if these societies and these individuals who have been doing so much good work have been able to achieve by isolated effort so much as they have done, if they can show such admirable returns as have been proved by statistics, then, in the name of common sense and humanity and patriotism, can we not, by confederating, do a great deal more to extend that class of work in those towns, villages, and communities where no such agency exists, and to create any other class of work which may fill up the great gaps in our system, and so provide that, over the whole country, there shall be enlisted such an enlarged public opinion as will create agencies where they do not exist and will supplement and strengthen their work wherever they do exist. (Cheers.) We have not the slightest desire, those who have been interested in the formation of this league, to do otherwise than say to every existing agency which is doing good, whether to the physique or to the health, or to the morals if you like, or to the social conditions of men and women, boys and girls—we have not the slightest desire to interfere with their work, but rather to say, “Join your hands with us and with one another and create such a national confederation and council and league on behalf of the physical well-being of the people that your efforts will no longer be isolated. You will no longer feel you are toiling alone, but you will be conscious of belonging to a great national federation which is determined to do everything in its power to sustain your efforts—to extend and invigorate the systems you yourselves have inaugurated. (Cheers.) If that is the case, what I should like to say over and over again is this—every member of the Council who has been at work in connexion with the establishment

of this League feels to the full the enormous debt of gratitude which this country owes, and which every humanitarian owes, to those noble people I have alluded to, and we acknowledge that, if we shall be able to awaken our fellow-countrymen's interest in this movement, it is largely due to them. One other word, and then I have done. A federation needs, as it seems to me, the co-operation of three great classes of public workers. There is the practical worker, those to whom I have alluded. They have been dealing with boys' clubs and the housing of the poor and other matters. But besides these there are a great number of societies which, though they cannot be said to be charged with practical work, yet may be looked upon as the very founders and foundation of the possibility of practical work—the scientific societies. (Hear, hear.) My Lord Mayor, what we want is that the practical efforts of loyal-hearted workers shall be supported by the teaching and knowledge of the expert, who has considered the matter from the intellectual and statistical point of view. (Cheers.) And hence our suggestion to-day is that the federation should not be one of practical workers alone, but also consist of those societies which deal with questions bearing upon public health and public well-being—societies which are collecting material on which to form an adequate and proper judgment in these matters, and that they shall meet in counsel with the practical agents, and that their knowledge and experience shall go hand in hand in the creation of such methods as may be for the general public well-being. (Cheers.) If I may, I should like for a moment to give an example of what I mean. Take simply the question of the sterilization of milk. Now, so far as we can read from the inter-departmental report, doctors disagree as to the value, the nutritive value, of sterilized commodities. Can the practical agent pretend to have an opinion on that subject? I have no opinion on the subject. How can I have an opinion? I am not a chemist, I am not a doctor. I think you will agree, therefore, that what is required is, as this inter-departmental report suggests, that these questions on which doctors disagree should be immediately referred to a committee of experts, to tell us what are the facts of the case, and, in that way, by gathering the opinion of the scientific experts, and laying that alongside the practical knowledge and experience of the daily worker, you will get a kind of influence much more clear, much more forcible, than that which attends the

divided effort of the scientific and the practical worker. (Hear, hear.) There is the third element—the Parliamentary. The inter-departmental committee's report refers to certain legislation as desirable, and hence we would propose that people interested in what I will call—you will excuse the phrase, my Lord Mayor—Parliamentary philanthropy, shall also be enrolled among the members of this League, so that we shall have the counsel of the Parliamentary expert as to the best methods of initiating and helping forward legislation. And, finally, by the confederation of these various influences—of the practical worker, of the scientific investigator, and of the Parliamentarian—we shall get together such a strong organized set of public workers that will influence public opinion, and it will be felt that we are not among those who imagine, as some eager, impatient souls do, that they can create a revolution in a moment, but we shall quietly and steadily form a council of well-digested and well-considered thought as to the best means of helping forward every tendency, every effort, and initiating every kind of new enterprise which will contribute to the health and well-being and the physical stability, as well as, I hope, because that also follows, the moral greatness of this country and people. (Cheers.)

The LORD CHIEF JUSTICE said :—My Lord Mayor, Ladies, and Gentlemen,—It is extremely difficult to add anything by way of supplement to the eloquent words which have been addressed to you by the Lord Bishop, and I feel very grateful indeed to those in authority that I have been allowed even for a few moments to detain you in seconding this resolution. As the Lord Bishop has said, and I wish to enforce that myself, this great meeting is the outcome of an awakening of national thought due to many causes, but to none more than to the noble and magnificent work that has been done in the metropolis and elsewhere by our school missions, our college missions, and many other organizations, and by the philanthropy and disinterested work of many self-denying men whose names are unknown to the newspapers and to the public, and who, to my knowledge, in more than a score of cases, have devoted the best years of their life to this work without the least wish on their part of their names ever being mentioned in public, and who only look to the result of the work for their reward. My Lord Mayor, in this metropolis, even speaking of that alone, we have only touched the fringe of this question. We have made inquiries into this matter

contemporaneously with the report of the committee to which the Lord Bishop has referred, and we found out that there were between 300,000 and 400,000 lads and girls in the metropolis who require to have some care and attention bestowed on them in order that they may have opportunities for moral and physical recreation, and for harmless amusement. We found that, with all the agencies combined and the self-sacrificing work carried on by so many, only about one-eighth, perhaps one-seventh, of that number had been reached. Even in saying that perhaps I am overstating the numbers that are reached by the present agencies. What we have felt, we who have been endeavouring to organize this movement for more than two years, is that there did require to be that to which the Bishop has referred—a more thorough, a more united, a more wholesale organization, so that those forces of which he has spoken—the scientific, practical, and Parliamentary—might be combined and brought to bear upon the questions which are occupying our minds. (Hear, hear.) I rejoice to think that this meeting represents the outcome of the feeling that such agencies as have been alluded to shall be more generally established. We wish to see them increase, not only in London, but we trust that this meeting may induce the corporations of large towns to start local organizations with the same object. There are others who will speak to you this afternoon, who will address you, and can address you, with great learning and experience from the point of view of medicine, and social reforms, and moral education, and from the general standpoint. I am not going to occupy any time at all by touching on these matters. Others can deal with them much better than I can, but I may be allowed, perhaps, having come from a long sitting of a Court, in a few minutes between that and other public duties that I have to perform, to say one word from the point of view that I may be entitled to speak from with experience, and that is, its effect upon the moral condition of the working classes with whom we have to deal. I say without hesitation, after now nearly 40 years' work at the Bar, and a few years upon the Bench, that those of us who inquire into the cause of crime and the cause of the moral and physical deterioration of this country, speaking of the class with whom this agency hopes to deal, the workers, that, second to drink, and second only to drink, the real cause of crime, is the difficulty of finding healthy recreation and innocent amusement for the young among the working classes. (Cheers.) I ask you to look at it from our standpoint. We have our children,

our boys and girls, what do we wish to do? We wish to give them, from the time they leave public school or grow up, healthy amusement. We wish to see them with the opportunity of innocent enjoyment. What is the condition, not of scores, but of hundreds of thousands of the class to whom I am referring? What is the only playground they get, if something of this kind is not provided for them? It is the streets. It is not their fault. It is the accident of their existence. It is the condition of life with which they have to battle. There are the long winter evenings which have to be passed without any attraction at home, and the boy or the girl brought up in those conditions, in homes which cannot provide the opportunities of recreation, have only one place to go to, and that is the street. It is the experience of Judge after Judge, of Police Court Magistrate after Police Court Magistrate, of philanthropist after philanthropist, who is doing his best to rescue these young people, that it is in the street that they have met with temptation. Their homes and their surroundings provide them with no means of innocent recreation and amusement, and so they turn out into the street, and that leads to pitch and toss, to gambling, to drinking, and to other temptations which you all understand, and which no one wishes to dilate upon in such a meeting. What is the duty which rests upon us to endeavour to keep these boys and girls from going wrong? Surely we should endeavour to establish throughout the country, by means of our corporations and public bodies, organizations which shall at least provide to some reasonable percentage of these lads and girls the opportunity of innocent recreation and of physical development. I know this is a vast subject. I know it is one at which those who have been labouring at it have almost felt staggered and terrified when they have found themselves face to face with the evil. They have felt it has been impossible to cope with it. But surely, as the Bishop has said, we can now, at any rate, do something to start this organization and interest public opinion in the work. There are two societies, whose names have been prominent before the public, who have been endeavouring to arouse public opinion. There is no reason why they should not work together with us, and perfectly harmoniously. The work is big enough for all. (Cheers.) There is not the smallest reason why there should not be an organization to take over the work in the metropolis and one to carry on the same good work in the large towns. I know from personal experience that those organizations to which the Lord Bishop has referred, and which have been working for the last 15, 20, and 25 years, in some cases from 30 to 40 years—I know that they will welcome the advent of an organization which will help them. (Cheers.) There will be no jealousy. Not very long ago we called together the leading members from the various London missions in order that they might, as far as possible, co-operate, not only to promote

the interests of their own missions, but co-operate in order to induce people to help in other missions with which they are not personally connected. What we all felt was that the time had come for doing something to improve the national physical development and moral education of the working classes. We want to band together all those who are anxious to assist in this good work and who are prepared to make some self-sacrifice in doing their duty towards their fellow creatures. My Lord Mayor, I have nothing more to say on this matter. I trust and believe that the opinion which has been so loudly and so widely echoed throughout our great towns and throughout the metropolis will lead to some practical results. As the Bishop has said, it is an evil which can be only combated, or should be, by united action, and that all the agencies at present engaged in isolated work should be invited to combine their experience and assistance, so as to cover the whole country with their influence. If we can obtain from you who are present that support which we hope to obtain, and through you the support of others whom you can influence, we may hope that our efforts will be crowned with success. We want not only your sympathy, but also your personal work, and, of course, your financial support. If you give us these you will be helping in the establishment of agencies which have for their object that best of all things next to religion—the moral and physical education and improvement of our working classes. (Cheers.)

The resolution was carried unanimously.

SIR WILLIAM BROADBENT, Bart.—The resolution I have to move I will read at once. It is—"That this meeting, assembled at the Mansion-house, under the presidency of the Lord Mayor of London, therefore heartily approves of the federation designed for this purpose and of the proposed efforts to start organizations in those parts of the country where none exist." You will see at once that this resolution is a corollary of the first. It is because the first commends itself to all of us that the second, as a means of carrying it out, is placed before you. This federation, this great co-ordinate body, remains, of course, to be organized, and that is a work which will demand very careful attention. The whole object of this movement for physical education and improvement really is the promotion of the public and individual health. Health does not always mean the same thing. There is a sort of health as long as the individual is adjusted to his environment, but the health of the dweller in the slums is different from the health of the country labourer, and the health of the city clerk is different from the health of the mountaineer. The great object of this movement is the general raising of the standard of health. Towards this all sorts of organizations are required, and I should like to claim for my own profession that they have been early in this movement. (Hear, hear.) It is entirely through the action of the

medical profession that we have that splendid army of public servants—the medical officers of health. If it had not been for them the population would have been less by hundreds of thousands. We should have been a great deal further down the road of degeneration. They, with others, have co-operated in this great endeavour to neutralize the evils which have come from the increasing population, from the shifting of country to town, from the changing from agricultural to industrial occupations. The work of an organization has to be begun at the beginning, and much as his lordship the Bishop has spoken of the necessity of dealing with infantile mortality, more might still be said. It is one subject which has not hitherto engaged as much attention as it ought. The great evil which has to be dealt with by our hospitals, by all those engaged in the relief of destitution, and of crime, even—they are all really engaged in undoing the effects of early parental neglect and ignorance and carelessness. It is here, then, that we have to begin. And the Bishop did not fully show the depth of the evil that has to be dealt with. He told you of the difference of 100 to 125 per thousand in the children that died. As a matter of fact, in some country towns the infantile mortality is not more than 80 or 90 per thousand, while in others it is 250 per thousand, and in certain quarters in these towns it is 500 per thousand. Half of the children born, die, and in some families even more than that. Now the whole future health and welfare of a person is very often determined within the very first few weeks of its life. If the child is nursed by its mother, if it is surrounded by favourable conditions, it is not only that you save its life, but you improve the tone of its health throughout the whole of its life, and in diminishing the infantile mortality you are not only saving life, but you are imparting knowledge which will have the effect of doing a great deal to raise the general health. This is the work which is being taken up, and here is found what has already been referred to—the enormous influence and power exercised by the ladies and the women of the community. (Hear, hear.) It is through them that the mothers will be reached, it is through a kind word, through their gentle influence, that the child will be nourished, and if it is fed at the breast instead of being brought up in any sort of fashion, the question of whether sterilized or non-sterilized milk is best would be relegated to a secondary position. It is through the work of ladies that an enormous amount of good in this respect will be done, and then we have to follow the children through their school life. The best is not done for children at school, and one of the movements on foot is that hygiene and temperance should be a part of the education at every elementary school. If the children are educated in these things themselves, they will carry the lessons home, and in this way become one of the agencies for an enormous amount of good. One might go on through childhood and adolescence and see the number of

agencies at work for their advantage—school drill, cadet corps, which bring boys under better influence than the influences of the street, and one must not forget great societies such as the National Health Society, for splendid work has been done by them. (Cheers.) And it is, as one speaker has already said—it is not only the physical health and vigour, but character, which is the basis of everything that will be improved by the efforts made to improve the physical education of the children. So much has been said that no more is required from me, I think, than merely to move the resolution which I have already read.

ALDERMAN and SHERIFF STRONG.—My Lord Mayor and Ladies and Gentlemen,—I have the honour to second the resolution which has been proposed by Sir William Broadbent, and having regard to the number and quality of the speakers that are to follow me, I shall not venture to detain you more than a very few moments in urging your acceptance of this resolution. But perhaps I may be permitted to say a word or two as representing the commercial aspect of this great question, and to remind you how vastly important it is, if we are to maintain our position of commercial supremacy which it has been our ambition to hold for so many years, that we must take every precaution that our efforts in that direction shall not be handicapped by physical inefficiency. (Hear, hear.) Every business man will feel in sympathy with me when I say that the commercial world stands almost aghast at the ever-increasing keenness of commercial competition. And surely the only way in which we may hope to meet that, with any degree of success at all, is to so arrange that our machinery—namely, the labour upon which we depend—shall be brought up and maintained in the highest state of efficiency obtainable. (Cheers.) I always think that the birth-right of every child born who has to look forward to a life of work should be a sound body, in which gradually he can develop a sound mind. (Hear, hear.) And you may remember that James Russell Lowell drew a picture of the ideal working man in contrast, somewhat, to the more favoured son of a wealthy man, and he asks the question of the working man by saying, What does the poor man's son inherit? and replies—

Stout muscles and a sinewy heart,
A hardy frame, a hardier spirit;
King of two hands, he does his part
In every useful toil and art.
A heritage, it seems to me,
A king might wish to hold in fee.

But, ladies and gentlemen, we find from the experience of our commerce that that picture is no longer to be seen in all its fulness. That is to say, we are constantly met by at least a residuum of our workers who fall out for various reasons which have been dealt with by experts on the subject, and so diminish the commercial capacity of this great country to deal with the commercial problems that are always before it. There is, as you

know, a very considerable discussion going on as to foreign competition and what it is to do for us. I will not venture to go into any vexed question or touch any subject upon which various opinions will prevail, but I do venture to suggest to you that it would be wise on our part to deal first with the enemy within our gates before seeking to control those who are outside of these limits. (Cheers.) And we can certainly be doing that about which no two opinions can be held when we invite the co-operation of every agency towards the greater development of the labour of our own country and the greater efficiency which will thus be placed in our hands of meeting competition from whatever source it comes. I venture to think that the competition which threatens this country is largely a matter to be dealt with by the country itself. I believe that

Naught can make this country rue
If England to itself remains but true.

It is here pointed out, upon evidence which we dare not question, that there is a falling off in the physical fitness of our people. This organization comes to our help and offers its aid in checking the national defect and in so organizing our forces that we shall meet with improvements in future in the conditions which now surround us. I venture to think that this organization will be doing a work not only for the individual good of all who come within the reach of its influence, but will confer a distinct and valuable advantage upon this great country as a whole, and especially upon the commercial community composing this country. It is, therefore, with great pleasure that I second the resolution. (Cheers.)

Mrs. BRAMWELL BOOTH.—I am happy, my Lord Mayor, to support the resolution which has been proposed by Sir William Broadbent and so ably seconded by Alderman Strong. It has devolved upon me to address you this afternoon because, owing to a prior engagement of an important nature, my husband was compelled to refuse Sir Lauder Brunton's invitation to address you. I would have preferred that he should have occupied these few moments. He would have been very much better able to deal with the questions before us. As leaders among the Salvation Army we do welcome the inauguration of this society. From our knowledge of the conditions that obtain in many parts of the country and of the melancholy ignorance which prevails amongst large sections of the community we realize that there is before it a field of usefulness which will be of great benefit to the nation. (Hear, hear.) It seems to us that this is an age of great specialization in every department of life, and it seems proper that, just as we have special societies and special plans for dealing with particular evils, there should be a missionary enterprise organized and equipped to deal with this particular subject which, undoubtedly, is one of great importance, both morally as well as physically. And

I rejoice in the fact that this society represented here this afternoon will endeavour to strengthen the hands of the societies already in existence. (Cheers.) It seems to me, my Lord Mayor, that I may feel specially called here to support the society because it can bestow such immense good upon the nation by teaching the people a pure and free and high ideal of motherhood. (Cheers.) The question which is occupying us does seem to me to be, before all, the question of good mothers. (Hear, hear.) It has been said, well said, that in order to be good we must be well born, and it seems to me that it will be a work of the highest benefit to the community at large and to our dear country if we can set before our people what it means to be a true mother, and if we can so influence them and instruct their minds and shape their feelings so that the mighty force, just as the tide creeps in at every nook and cranny of the coast, shall pervade society as a healthy public opinion in favour of a pure, an instructed, and a free motherhood. In the few moments at my disposal I would like to allude to one or two of the leading principles that it seems to me must lie at the basis of such a conception, and I hope it will be found possible by this association to urge them upon our people. And, first of all, how necessary it is to exalt the idea of marriage, to take it altogether into a new plane, to raise it alike from the sordid contract of social convenience or financial advantage or a hasty union of passion, and from the ill-conditioned assortment of an ignorant lad and an undeveloped girl. (Cheers.) We can have no hope for the motherhood for which we plead and the nation needs without marriage based on the pure reciprocal love of one man for one woman. Such a marriage will prove a union under the sanction of God's Providence. It may not be a sacrament, but it will be, whether recognized as such or not, a sacred thing. And then let us firmly declare that such a wife must be free. I hope you understand me—free in the disposal of her own person, free as regards her own thoughts and convictions, free in the very highest sense of the word. And when this is achieved we shall have travelled far towards the motherhood which realizes the greatness of its occasion and honours its part in continuing and ennobling our race, and will welcome to its arms without a shadow every new life entrusted to it. Ladies and gentlemen, it augurs well, I think, that we have heard these words from Sir William Broadbent this afternoon, and that there are other eminent gentlemen here who have expressed their sympathy with this society, and I suppose to them we must look—I confess in the past I have not been able always to do so without some misgivings—to enforce that great law of nature to which Sir William Broadbent alluded—that the true mother will herself nourish her child, that any mother to shirk that duty, if circumstances permit her to discharge it, is a shame on her, and that any mother should be prevented by

poverty or want is a shame to us as a nation. (Cheers.) If we fail in our children, what will become of our race? (Cheers.) Not all the merchandise of the seas, whether we get it here protected or unprotected (laughter), or, as Mr. Rider Haggard has been saying, not all the wealth of the world can supply the place of children. And then I think it ought to be understood that the true mother is the child's first teacher. (Hear, hear.) It will learn most from whoever loves it most, and upon her we must insist for the responsibility of that training of the heart besides which, as Sir Walter Scott said, all other training is moonshine. The Spaniards have a proverb that "an ounce of mother is worth a ton of priest." (Laughter.) Our mothers of to-day may be, perhaps, emancipated from the priesthood, but do they not need to beware of delegating to others, even though they be able and experienced professors, whether of religion, medicine, or science, duties and responsibilities which they are best fitted to carry out? The mother for whom we plead, the mother whom this society will, I believe, work to bring about, will be herself the chief instructor of the child, and will be one whose example of unselfishness, of instructed unselfishness, will be the chief incentive to her children to lead a noble life, and in their nobility of character and physique, in their devotion to duty, in their patriotism, and in their love of honour and truth, she will find, first by anticipation, and afterwards by happy experience, the real joy of her life. With this, it seems to me, all wordly display and all wordly comfort, all sensual gratification, all happiness of every kind, is as nothing. (Cheers.) Let us show the nation, let us, happier mothers placed in happier circumstances, show them that the mother's instructed unselfish love returns with a thousand-fold blessing to her own heart. And you will not be surprised that I, as a Salvation Army officer, would add that the mother, in order to realize this supreme ideal of motherhood, will be one who, having received her children in the spirit of our Saviour's words when He said, "Whoso shall receive one such little child in my name receiveth me," and having trained them in that unselfishness and restraint which she has learnt from Him, will guide their feet to His throne in humble prayer and dedication, and that she will let them hear from her lips the secret things of life and send them forth forewarned and forearmed to meet the evils that are in the world, and to embrace love, purity, and devotion in the service of their God. (Cheers.) I say, can we not help even the poorest of the poor, whose difficulties, whose trials, the perplexity of whose circumstances, I am convinced, is very little understood by most of those who are here to-day; but can we not help to teach even them, and instead of relieving parents from their responsibility for the education and for the physical improvement and well-being of their children, and even, as appears to be contemplated,

the responsibility of feeding those children—I allude to the scheme for supplying free breakfasts—can we not by precept and example, and legislation, if need be, bring closer home to both parents the necessity, the importance, the happiness, and the reward of a closer attention to parental duties? (Cheers.) There would be, I am convinced, an actual saving to the nation if even some money were expended in some way by encouraging parents who do well by their children. (Cheers.) And surely we have reached the stage in our civilization to-day when, if we can prohibit those very children from earning for themselves the pence which will bring a little bit of bread to their mouth, and perhaps keep together the little home over their heads, we can find some penalty for the selfish parents who waste their means in riotous living which should go to the care and support of their children. (Cheers.)

The RIGHT HON. R. B. HALDANE, M.P. :—My Lord Mayor, my Lords, Ladies, and Gentlemen,—The response that has been given to the eloquent speech to which we have just listened has proved that but little argument is wanted from any subsequent speaker. Mrs. Bramwell Booth has spoken as a missionary, and the answer that came from an audience usually critical and not prone, when it is of such a character, to let itself go, shows how much the heart of this meeting was with her. (Hear, hear.) The truth is, that this movement touches the work of missionaries of the most varied kind. There are those who care for their country. The future of the country rests with the future of the race, and the race rests with the future of the children. What bigger work could there be than the work embodied in these resolutions? Well, ladies and gentlemen, that work remains to be done, and it stares us in the face. If you go a few hundred yards from here and look at the children playing in the streets, you must realize how little is the chance of their making good citizens, how little is the possibility of giving them education. And that brings me to what, I think, is the central point of this whole movement—that it is a part of a great and comprehensive movement of education. You cannot have the highest education, you cannot have any education, unless you make those who are to receive it fit to receive it. You cannot save the soul unless you attend to the body. That applies in a great many fields of work, and it is not to be wondered at that the State should this Session have been taking up the attention of Parliament with the question of feeding the children in the schools. Whatever difficulties there may be in these propositions, what people are coming to recognize is that education is a far bigger thing than mere learning, that it means attention to the physical conditions of life as well as the conditions which surround the mind, and unless the one is dealt with the other will fail. And in knowing that, lies the hopefulness of the situation. I am not going to

hold you for more than two or three sentences more, but I want to make an appeal. This is one of the greatest meetings ever seen at the Mansion-house. It is a keen meeting, and it is full of people who can exercise influence in their localities. We are not striving to organize something new. It is a branch of educational organization—educational organizations abound at every turn—and many of you can influence this work in some particular way. Generally the difficulty about great objects such as we are here to discuss is not to be eager about them—people are mostly eager—but rather how to do something to give effect to them. You want to do something, and I suggest strongly that the bond of obligation is the existing organization. Set to work with new organizations, and in every way you can, but do not think you have fulfilled your duties or satisfied your obligation by that only. Every one of you with a conviction on this subject should use every endeavour on the local education committee in connexion with those who, whatever form of education they give, can be influenced, and take the opportunity of making these views known and of drawing attention to the work. It is the kind of influence that many people can exercise in varying ways, and it is the *esprit de corps*, the willingness of the people who will work individually, that are given the chance of doing something when a movement like this is launched. Therefore, I feel that, although this meeting disperses, and although we seem to have carried only certain resolutions, and to have laid the foundation for machinery of a more or less formal kind, the work, the main part of the work, will lie in the inspiring force which some of the speeches we have listened to may have on the minds of those who in their own way can bring to bear an influence for good in particular directions. (Cheers.)

ALDERMAN and SHERIFF STRONG.—I am desired to announce that cards have been handed round or placed in the seats inviting you to subscribe your names as willing to become members of this National League for Physical Education. Those who are in sympathy with this movement and would like to show it in a practical form by becoming members, are invited to do so. Sign your names and hand the cards to one of the stewards.

Mrs. BRIDGES ADAMS, rising in the body of the hall, was understood to say that she wished to move an amendment, and asked if she would be permitted to do so.

The CHAIRMAN.—No amendment can be allowed at this meeting.

The resolution was then carried *nem. con.*

SIR JAMES CRICHTON-BROWNE.—I have to move a vote of thanks to the Lord Mayor for permitting this meeting in the Mansion-house, for presiding over it, and for thus giving his countenance and support to a movement which, as Alderman Strong has intimated, is closely concerned with the best

interests of the great City of which he is the Chief Magistrate. The wealth, the trade, the commerce, and civic life of London depend on energy. While energy abounds they will flourish, when it fails they will decay. Should that great store of physical energy, our coal measures, give out, as it is predicted they will in the course of a few centuries, London will languish into insignificance, and should the great source of our vital energies—the blood, bone, and muscle of our people—deteriorate, as it is possible they may do at an even earlier date, then not less surely will London “pale her ineffectual fires.” It is proper, therefore, that the Lord Mayor should assist at the inauguration of a league which has for its object the conservation of that vital energy upon which the welfare of the City of London, and not only the City of London, but of the whole nation, depends. Monsieur Paul Sabatier, speaking at Kensington a few days ago, said that during the last 10 years a new orientation in the minds of Frenchmen has taken place. From being citizens by fits and starts they had become continuously and altogether citizens. They have awakened to a sense of their responsibilities, they have realized that the active performance of private and public duty is the sole guarantee for the future of their country. And Monsieur Paul Sabatier attributes this happy change, this working of fresh sap in the ancient trunk, largely to the influence of the new association *L’Union Pour l’Action Morale*, composed of men of all sorts of opinions, of the most varied views, who meet to discuss questions affecting the public interest with earnestness, courtesy, in a scientific spirit, and with no sectarian or political bias, and take means to spread abroad their views. Well, it is hoped that this League which we are launching this afternoon will effect a new orientation in the minds of Englishmen on the subject of physical education and improvement. It is to be hoped that it will convert the many fits and starts that have been made in this matter into steady, sustained endeavour; that it will awaken the public to a sense of its responsibility and keep it awake; that it will, by bringing together men of many different ways of thinking, arrange for a general campaign; that it will, by co-ordinating existing agencies and creating new agencies where they are required, provide systematically throughout the length and breadth of the land the machinery necessary for bettering the condition of the people. And let no one suppose that there is not a wide field and ample room for the operation of this society. Due acknowledgment has been made by the Lord Bishop and others of the work, the beneficent work, the splendid work, that has been done in connexion with physical education and development by many clubs, societies, institutions, and schools throughout this country. But that work has been scattered and disjointed. It has been more or less spasmodic. It requires concentration and organization, it requires enlightened influence and control, and,

above all, extension, for the agencies at present existing are altogether inadequate to deal with the masses of social and physical deterioration that are piled up around us. We are forbidden to enter upon the knotty and controversial question as to whether our race, as a whole, is deteriorating or improving, and I do not intend to break bounds, but I should like to remind a certain class of people amongst us, if I may coin a word I would call them placeboistes, who assure us that we are steadily ascending in the happiest epoch of the best of all possible worlds, and who, when any social blemish or malady is brought to light, are content to prescribe coloured water or a bread pill instead of a radical remedy—I should like to remind these placeboistes that the inter-departmental committee upon physical deterioration did not say that progressive deterioration is not going on among us. All they said was that the grounds for the apprehension entertained on that subject were at present insufficient. I would like to remind these placeboistes that, whether physical deterioration is advancing or declining, it exists around us to a deplorable extent, and that it is high time we dealt with it in no half-hearted manner. (Hear, hear.) We cannot afford to wait for some far off divine event, but we must grapple promptly with the weakness, the deformity, the deterioration, and the wretchedness that welter around us, and try to improve the breed of our people. If any one has any doubt as to the ravages and the existence on a large scale of physical deterioration, I would recommend him or her to consult a report on the social condition of Dundee published within the last three months. That report is a very startling human document, and justifies the remark of the Committee of influential Citizens responsible for it, that it reveals a very serious state of things, deserving the anxious consideration of all thoughtful persons. I am not going to trouble you with the details of that report, but I should like to say that it sets forth the results of the minute examination of 1,000 children in Dundee in elementary schools, proceeding on the lines already followed at Glasgow, Edinburgh, and Aberdeen, but carrying the investigation further and carrying it out with minute and scrupulous care. We all expected to be told that amongst the school children decay of the teeth, or caries, is all but universal; that as many as 33 per cent. of them suffer from defects of vision requiring correction by spectacles; that as many as 43 per cent. suffer from deafness, enlarged tonsils, adenoids; but it was beyond expectation to discover that, of these young children attending school, as many as 19 per cent. suffer from disease of the glands almost always of a tubercular nature, that as many as 5 per cent. suffer from disease of the bones, that as many as 9 per cent. suffer from disease of the lungs, and, what is more astonishing, that $7\frac{1}{2}$ per cent. suffer from disease of the heart, while a much larger number show a flabbiness and weak-

ness of that organ, the effects of underfeeding or of over-exertion. Positively, after reading this report one asks in painful astonishment, "Is the whole mass rotten, and is there one perfectly sound healthy child left?" The report draws a comparison between the condition, as regards height and weight, of the children attending elementary and secondary schools, and at all ages the difference is remarkable. But to take one example. At 13 years of age the children in elementary schools—those drawn from poor homes and the labouring classes—the boys are on the average 2in. shorter and 6lb. lighter than the boys in the secondary schools, who come from well-to-do homes, while, at the same age, the girls on the average are 3in. shorter and 13lb. lighter. Of course, we are not surprised to find that the mental defects and dulness are much more numerous among the badly-developed children than among those well-grown, for there is a more intimate connexion between the muscles and the mental faculties than is commonly supposed. We all know that muscular exercise, by improving the general health, conduces to the vigour of the brain, but we do not all realize that muscular movement is an integral part of mental activity. The muscles do not act alone of their own sweet pleasure. In what a state of agitation and twitching and convulsion we should be if they did. (Laughter.) They are under the control of the brain, with which they are in constant communication to and fro through those great fibres and cables, the nerves. And in the middle region of the brain there is a part called the motor area, where there exists motor centres in definite order presiding over the working of all the groups of muscles in the body, those of the tongue, the hands, the arm, and so on. But these motor centres of the arms, for example, do not grow or perform properly unless the muscles subtending them are duly exercised, and as these motor centres not only voluntarily control the muscles but take part in the mental life and supply us with motor elements for our ideas, we can readily understand how deprivation of muscular exercise at a time when these motor centres are evolving curtails the subsequent mental capacity. If you brought up a child in swaddling bands and prevented it altogether from movement, you would produce an idiot. If you want really healthy, sound-minded, well-balanced men and women, you must give plenty of muscular exercise in their early years. We thus see, as Mr. Haldane has hinted, that gymnastics, athletics, and games are really not, as commonly regarded, merely recreations or amusements, but branches of a liberal education. I am detaining you too long, but from my special point of view I should like to add that I anticipate beneficial effects from the working of this League. I hope that in course of time it will do something to stem that great turbid stream of insanity that is constantly flowing on with ever-increasing volume into our lunatic asylums. Much imbecility and mental diseases result from the

want of physical education and training, from ignorance of the laws of health or defiance of them. Let me give one example. Improper feeding in infancy often induces convulsions, convulsions often run into epilepsy, epilepsy often ends in madness. Taking the three great preliminaries—sunlight, fresh air, and pure water, this league has three departments in which to exercise its activity. These are housing, nutrition, and exercise. A man must have a roof to shelter him, a loaf to eat, and a spade with which to dig. In each of these departments there will be an ample outlet for all its activities and in each, I do not doubt, it will accomplish much if it be but liberally supported. (Cheers.) Let us trust it will be, and let me say, in conclusion, all we who are interested in this league are deeply grateful to the Lord Mayor for permitting it to start this afternoon under these favourable conditions. I beg to move a very hearty vote of thanks to his Worship, the Lord Mayor. (Cheers.)

Mr. J. COMPTON RICKETT, M.P.—My Lord Mayor, Ladies, and Gentlemen,—I have great pleasure in seconding the resolution of thanks to your lordship, more particularly because a great deal of the work of this association will have to be done in co-operation with local authorities and municipal corporations throughout the length and breadth of this country. We want money now, but we hope in the future to be able to show that it will be money saved even for local authorities to spend something in looking after the children and the interests of the youth of this country. I am asked to say that the papers distributed among you will be collected as you retire, and it is hoped that you will give a small sum, or promise one, so as to encourage those who are laying the foundation of this great work. Do not be afraid of subscribing even a small sum. We are in for a penny and we are in for a pound. (Laughter.) The society has been founded apart from political considerations or religious considerations. This is really the gospel of health, and therefore those who feel inclined to co-operate need not be alarmed that this society will be attached to any other movement, not even to rifle galleries, although out of a better physical condition of our young men there will be better material for the proper defence of these islands. But there is an ethical side to the subject. Have we not realized in listening to the able and eloquent speeches to-day the amount of pain that might be saved, the loss of life that might be prevented, the increase of population that might be conserved, if this society is at all successful, to any degree successful, in co-ordinating and directing the efforts which are being made with a view to the saving of infant life and improving the physical strength of our youth. Do not we realize how many of us seem to be afraid of an increase of population. Have we the craven fear of being great, even in numbers? Cannot we see to-day that we are falling in numbers, that we are approaching the condition of a neighbouring country where the population is stationary, and

which looks with some apprehension across its borders to another country where the population is rapidly increasing. Science will provide means for multiplying the food supply of the country, for making it possible in future, I believe, for many more people to live on a square mile than before, and in the broad acres of this great Empire we have plenty of room for all the men that we can breed, and for more. (Cheers.) And do we not realize the loss that it is to us that we should have a decline in our population. It is from among the masses of the people that come forth our great leaders, in the main, our poets, our artists, our great scientists, and our thinkers. We are thus making a mistake, not only in failing to do our best to preserve the lives of the children who are born, but in not giving equality of opportunity to those who grow up. I think that is a kind of socialism which we are all agreed upon in this room. I think we would all be willing, as far as possible, to compensate for that loss which prevents a child having a good start. We will not conceal from ourselves the doctrine of heredity, but we will also remember that heredity may be largely set aside by careful treatment of young children during the first two years of their life. There has been hinted at that which is in the minds of many of us—that this nation, having determined to educate the children at the national expense, must perceive that it is waste of money to spend money on children who are not in a physical state to receive education. Having gone so far as to spend millions on education we must go further and feed the child, so that he or she can receive it. I admit that if by a co-operative system our children can be fed far more cheaply than in scattered homes, the nation providing one or two meals at low prices, it is the duty of the education authority to recover the cost of them from every parent who is able to contribute it, and not to allow the parent to escape from his parental duty and responsibility. (Cheers.) Now, before I sit down—I compliment the meeting on holding together so long—I would like to say that there is one name that has not been mentioned in this hall to whom this whole scheme is due, who is the engineer of it, whose hand is on the machinery, and whose philanthropy and interest is only equalled by the modesty of his conduct in keeping in the background. I ask the meeting, although it is not on the agenda, to insist on having a few words from Sir Lauder Brunton. (Loud cheers.)

SIR LAUDER BRUNTON.—Ladies and Gentlemen,—In coming through the streets I saw a match which some one had used to light a pipe and then thrown in the gutter. There was a little water in the gutter, and the match fizzled and went out. It was a very small thing, this match, and did nothing. It could do nothing under the circumstances, but similar matches have set on fire the greater part of a continent, and the reason was that those matches fell where everything was prepared before-

hand. They fell upon dry grass, the dry grass spread the fire from stalk to stalk, sparks flew hither and thither, and a huge conflagration was lighted. Nothing could be smaller than a match, and nothing smaller than I could be. (No, no.) Even this meeting, large though it be, is but small, very small, compared with the country, and yet, in the words of the Bible, "Behold how great a matter a little fire kindleth." This may be the beginning of a movement which will spread not only through this country, but to all the Colonies, and we shall have, not only a greater Britain—great in regard to size—and united together by bonds stronger than those which have hitherto held us together, but we shall have every man, woman, and child better fed, stronger, better educated, and with a better morality. We shall be a better people as well as a greater people, and this will be due to all the men and women who have been preparing the work so long beforehand, and it will be also due, in a very large measure, to those men who have concentrated the work, and especially to the Bishop of Ripon, Sir Frederick Maurice, and Sir Henry Craik, who have headed the movement. I beg to support the vote of thanks to the Lord Mayor. (Cheers.)

The vote of thanks was agreed to unanimously.

The CHAIRMAN.—Sir James Crichton-Browne, Ladies, and Gentlemen,—I certainly thank you for this vote of thanks, but it will be a greater pleasure to me to know that this meeting has been a success and that this League has had its starting point at the Mansion-house. I hope that before 12 months are over we shall have a record of some very good work done by it. (Cheers.)

The proceedings then terminated.

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ADDRESS ON PHYSICAL TRAINING.

(Given at Johannesburg on Tuesday, August 29, 1905, Sir RICHARD C. JEBB, O.M., Litt.D., D.Ch., LL.D., M.P., in the Chair.)

By SIR LAUDER BRUNTON, M.D., F.R.S., ETC.

THE subject of physical training is a very large one, and may include the food and drink and general *régime*, as well as the exercises best adapted to improve the physique, but time will not allow me to take up more than the question of exercise. From time immemorial the threefold nature of man has been acknowledged, and has been expressed in the words body, soul, and spirit. Corresponding to these we have three kinds of education—physical, moral, and mental. In savage communities physical training receives most attention, for it fits a man for war, or the chase, and the results it produces are evident in the magnificent physique of such cases as the Zulus, which the British Association had opportunities of observing in the dances arranged for them in their recent visit to South Africa, by the kindness of the Hon. Marshall Campbell, at Durban, and the Municipal Authorities at Maritzburg.

The magnificent and beautiful cathedrals with which Europe is studded, bear witness to the importance attached to the care of men's souls at a time when learning was confined to a few, and most of the distinguished nobles and magnates were unable to write, and could only sign with a mark.

It is only of late years that the importance of a general knowledge of the three R's has become an article of belief, and like many new proselytes, we have been inclined in our care for the mind to neglect the body, and to neglect physical in our care for mental education. But mind and body cannot be separated. We do not know, and probably never shall know, the nature of the connection between body and mind, but there can be no doubt that the brain is the organ through which the mind works, and that a severe blow on the head, or

the bursting of a blood vessel in the brain may completely destroy the most magnificent intellect, and reduce it to the level of the infant. The close connection between the mind and the body is also shown by a number of everyday observations. A person who is unaccustomed to read will often move his lips involuntarily, silently framing the words, and thus helping his comprehension of what he is reading. A child learning to write, puts out his tongue, because the nerve centres for the tongue and fingers adjoin one another in the brain, and the excessive action of the one spreads to the other. This close connection was recognised by the ancient Greeks, and I have been informed by one of the greatest authorities on the subject, Sir Richard Jebb, that during the most flourishing period of Greek literature and the highest range of Greek thoughts, not only was the winner at the Olympian Games regarded with the greatest admiration by the people as a very successful cricketer is at the present day amongst us, but that physical training was universal, every one having to go through it. It may be held that too much physical training interferes with mental activity and development, and no doubt excessive devotion to sport and exercise may have this effect, but this is a consequence of the abuse and not of the use of physical training, and Socrates thought no less philosophically because he had great powers of physical endurance, and would have gained a V.C. for the rescue of his friend Alcibiades if he had been serving now in the British Army. The Greeks have left us two models of physical development of entirely different kinds. The one is the Farnese Hercules, and the other is that of the Apollo Belvidere, and the sister statue the Diana of Versailles. The Hercules figures a man of enormous bulk with the muscles standing out like lumps upon his trunk and arms, yet he is leaning lazily, almost drowsily, on his huge club as if he could hardly support the weight of his own body. In the Apollo, on the other hand, we see a model of perfect symmetry, no muscles too large, none too small, every part of the body adapted to work harmoniously together, and co-operate with the eye in carrying out the dictates of the mind. In the Diana we see the same strength, lightness, pliancy, and

grace, the same fitness of the body to serve the mind, and not to encumber it, as it seems to do in the Hercules ; for the body reacts on the mind as well as the mind upon the body. Memory, one would say, is a purely mental function, yet it is markedly influenced by the body. Thus in a meeting such as the present, where one sees many new faces and hears many new names, one is apt to become bewildered and to forget names completely. But if we repeat the name, not merely silently with the lips, but aloud, we remember it better, because the mental impression made by the sound of the name is strengthened by the sensations felt in the larynx as well as in the lips and tongue. If we write the name down we are likely to remember it still better, for we have the muscular memory of the fingers in addition. I speak of muscular memory, but it must be remembered that the memory which originates in the movements of the muscles has its seat in the brain, the various parts of which may be compared to a man of business with a number of clerks and other employés under him. When he has an entirely new staff they either do too little or too much, they get in one another's way and cause confusion. But when the business is properly arranged, each one knows what he has to do, and the master need only say to the head of a department do this, and it is done. We stand or walk, and are completely unconscious that in doing this almost all the muscles of our bodies are working together. If we try to bend a single finger whilst some one else tries to keep it straight, we can feel the biceps on the arm, and even the muscles in front of the chest, contracting at the same time, and the efforts of a child in learning to walk show us how difficult it is for the nervous system to co-ordinate the muscles so as to produce the proper movements. In children learning to write we also see the fingers cramped around the pen, which is firmly and almost convulsively held by them while the hand moves slowly and irregularly over the paper. It is only by practice that the mind learns how to regulate the muscles and make some relax whilst others contract. But as I have already said, the brain is the organ of the mind, and the proper performance of its functions depends on the circulation

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of blood through it. We see this in many people, who become drowsy and stupid after a heavy meal, for much blood being in their stomachs to digest their food, the brain is insufficiently supplied, and they cannot think. If, on the other hand, they force themselves to think after a heavy meal, they take the blood away from the stomach to the brain, and consequently their digestion suffers. A free supply of blood to the brain is needed for good mental work, and how can this be best obtained? You all know that a little exercise quickens your pulse, and the increased circulation thus produced quickens thought in many people who, like the peripatetic philosophers of ancient Greece, think best when they are slowly pacing to and fro. Others again will jump from their chairs from time to time, take a few hasty steps, and then sit down again to their desks. But the activity of the circulation depends to a large extent on the strength of the heart. Now the heart is just a hollow muscle, and it behaves like other muscles. Like them it grows stronger with exercise, but like them it may be weakened by over exercise and strain. The breathing too must be considered, for unless the blood is properly aerated it will not nourish sufficiently either the heart, the muscles, or the brain. What we need then is a system of physical exercise which shall develop the circulation and respiration as well as the muscles and the nervous system. By systematised movements and by the use of dumb-bells or clubs the muscles may be made large and strong like those of Hercules of old or of Sandow to-day. There can be no doubt of the utility of such exercises to a limited extent, for the circulation and respiration participate in the increased nutrition, so evidently shown by the larger size of the muscles, and thus the functional power of the brain becomes greater. Such exercises are of much use also in ensuring that no muscle is left inactive, but that all are called nearly equally into play, for such exercises can be easily modified so that any part of the body that tends to be insufficiently developed can be brought into action and its growth increased. The objection to such exercises is that there is a considerable amount of monotony attached to them, that pupils weary of them, and they then are regarded with aversion rather than pleasure. Now pleasure is

a most important element in everything which concerns the welfare of the body. The celebrated Russian physiologist Pavloff has shown that the digestibility of food depends on its palatability or tastiness as much or more than on its nutritive qualities; the same is the case with exercise: if it is wearisome and distasteful it does but little, but if it is enjoyed it does much good. Now the natural exercise of young people is games, and especially games of ball. The ancient Egyptians have depicted games of ball in those wondrous pictures, which are as fresh now as when they were painted, thirty-five or forty centuries ago. Homer tells how they were played and enjoyed by the Greeks, and they have lost none of their charm at the present day. In all their forms, cricket, baseball, hockey, tennis, lacrosse, &c., games of ball are probably more useful than any other, for they not only bring into play almost every muscle in the body, but train the nerve centres also to judge of the distance, position, and speed of the ball, and to co-ordinate the movements of the limbs accordingly. The best physical training, I think, consists in a combination of systematic exercises with games, so that the two may supplement each other. For girls' schools I should much like to see the carriage of a pot or calabash on the head introduced as a regular exercise, for the graceful carriage which this imparts to all the women who habitually employ it, whether they be Zulus, Egyptians, or Italians, is most admirable. Before concluding, I should like to mention the Japanese method of physical training, Ju-jitsu. This consists of exercises for children, women, and men carefully thought out and admirably adapted to their purpose. The training of men is to a great extent a system of attack and defence, which enables anyone proficient in it to protect himself (or herself) against the attacks of one or more strong assailants. I believe that before long this system will be taught to a greater or less extent in every public school.

The question, "Where does exercise end and over exercise begin" ? is one which cannot be answered in general terms, for it varies not only with different persons but with the same individual at various times, and what would be quite insufficient

exercise for a man in his ordinary condition, would be excessive over exercise for the same person if he were just recovering from typhoid fever. The question can only be answered by medical examination repeated from time to time as required.

The problems of physical training and of other subjects connected with health in schools are now engaging much attention, and an International Congress for their consideration was held last year at Neuremberg. The next is to be held in London in the first week of August, 1907, and committees are being formed all over the world to prepare for it. Promises have already been received of the formation of committees in Cape Town, Durban, and Maritzburg, and I trust that Johannesburg will not be behindhand in this respect. We wish the co-operation of teachers, doctors, and all interested in the health and welfare of the rising generation, and if anyone is unable to obtain here all the information on the subject which he would like, he may have it by applying to the General Secretaries of the International Congress for School Hygiene, Parkes' Museum, Margaret Street, London, W.

I have already said so much about the utility of exercise and games as a part of education, that it seems almost unnecessary for me to express my admiration for the efforts of the Misses Laurence and Earle to associate games and bodily exercises with mental work in education, and to wish them most hearty success in their endeavours, as well as to thank them for the meeting they have organised to-day.

TRAINING AND WORK.

ADDRESS TO THE SHEFFIELD FEDERATED HEALTH
ASSOCIATION, JANUARY 29, 1906.

By Sir LAUDER BRUNTON, M.D., D.Sc., LL.D. Edin., LL.D.
Aberd., V.-P.R.S., Consulting Physician to St. Bartholomew's Hospital.

Mr. CHAIRMAN, LADIES, and GENTLEMEN, The subject that I have selected for my lecture to-night is that of Training and Work. Work is sometimes a great burden when excessive, because it may cause suffering, disease, and death. Yet work on the whole is a blessing and compulsory idleness is a curse. We hear at present a great deal about the unemployed and of the misery that want of work is causing to unemployed men, to their wives and to their children. There can be no doubt that the existence of so many unemployed is a great evil, and in order to remove it we must try to find out the causes to which it is due. The unemployed may, I think, be divided into three classes, first, those that cannot get work; second, those that cannot work; and third, those that will not work. The reasons why some cannot get work depend on commercial and economic conditions which it would be apart from my subject to discuss to-night. I may, however, mention one point to which I will afterwards have to refer, namely, that work has a great tendency to go to the cheapest producers. While strikes and limitation of the hours of labour may raise wages for a time, yet we have to consider that we have now competitors in every part of the world, and that increased wages or diminished output of work in this country may throw contracts into the hands of our foreign rivals. To avoid this and to maintain our supremacy as a manufacturing nation, it is advisable for us now, and it may be absolutely necessary for us in the future to increase the working power of our men, and the means of getting better food and more comfort out of their wages, even

though those wages should be smaller than those they earn at present. It seems to me that one of the reasons why some French and German workmen are able to work more cheaply than ours is that the cost of their living is smaller, and that by their methods of housekeeping they actually get much more comfort out of their smaller wages than our men do at home. Especially does one notice that in France the wives of artisans will furnish a most appetising meal from cheap materials, some of which in this country would be thrown aside as waste. A knowledge of cookery on the part of the wives is one of the means by which our artisans may hope to get more nourishment out of their food, and more pleasure in their meals, so that they will feel less need for stimulant than they do at present. But it is the girls who are at school now that will be the wives of ten years hence, and to this subject I must again return in considering training.

The next class we have to consider are those that cannot work. We see numbers of people, some of whom may be erippled, in body, and others crippled in mind, who are unable for work of any kind, and these are provided for in our infirmaries and asylums. But there are many more who are free from any obvious disease either of mind or body, and yet who are so generally feeble, or as the Scotch term it, "feckless" that they can do little exepting unskilled work, and not a great deal of that. Many of these have been neglected as children, ill fed in youth, and grow up to be a burden upon their relatives, upon their friends, or upon the rates. One of the great objects we should aim at is the extinction of this feeble folk by raising in its place a race of healthy babies, sturdy children, and strong men and women. The means by which this may be done we shall come to later on.

The third class are those who won't work. Last year the Guardians of the Poor for Westminster gave way to a demonstration made by the unemployed and decided to open labour yards for them. The work was easy, chopping wood, for three days in the week. The pay was good, averaging eighteen or twenty shillings a week for a family of four persons, only the man being required to work. Five hundred men had taken

part in the demonstration, but out of these only one hundred and fifty appeared in the labour yards on the first day. Every day afterwards the number diminished, and on the fifth day there were only five men who thought it worth their while to do this easy work for the pay. At the end of a fortnight the labour yards were closed and have not been opened since. Here, then, we have a lot of men who would not do steady work for steady pay, and yet there seemed to be no reason why they should not do so. One is very apt to say that this is entirely a moral question, and has nothing to do with physical conditions. No doubt it may be so, but my business is not to preach morality, but to discuss training.

We talk of the mind and the soul, of intelligence and morality, but we can only judge of these possessions of a man

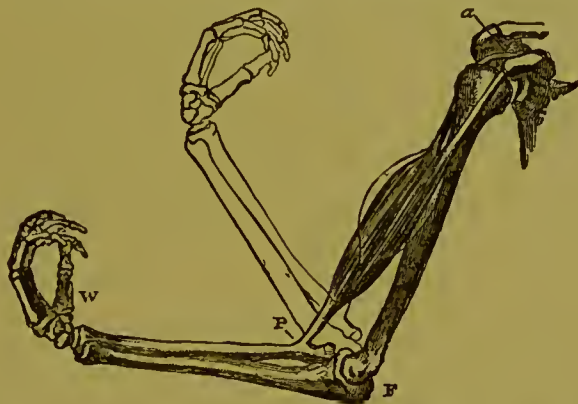


FIG. 1.—Bones of Arm, with Biceps Muscle passing over two Joints—that of the Shoulder and that of the Elbow. From Huxley's 'Physiology.' By kind permission of Messrs. Macmillan and Co.

by his acts, by what his face expresses, his tongue tells, or his body and limbs do. Now all the motions of the face, tongue, and body are due to contractions of the muscles, the little masses of flesh which you see in a butcher's shop, and which during life moved the limbs of the sheep and oxen. You can feel the same in your arm by placing your hand upon it and then raising your hand to your shoulder, when you will feel that well-known muscle, the biceps, become thickened and shortened in the process. By this thickening and shortening of the muscles the bones are moved and actions are performed. It is important that these actions should be done quickly, and this is

effected in many cases by having the muscles pass over more joints than one. Thus the biceps passes over both the shoulder and elbow joint, and by its contraction tends not only to bend the arm at the elbow, but to raise the elbow itself towards the shoulder. The same arrangement occurs in many other joints, as you will see from Fig. 2, which I have copied from Professor Huxley's Lectures on Physiology. Even in such a simple act as that of standing, a great many muscles have to act together and, to use Professor Huxley's words, "This position, easy as it seems, is the result of the contraction of a multitude of muscles which oppose and balance one another. Thus, the foot affording the surface of support, the muscles of the calf must contract, or the legs and body would fall forward. But this action tends to bend the leg, and to neutralize this and keep the leg straight, the great muscles in front of the thigh must come into play. But these, by the same action, tend to bend the body forward on the legs, and if the body is to be kept straight, they must be neutralized by the action of the muscles of the buttocks and of the back. The erect position, then, which we assume so easily and without thinking about it, is the result of the combined and accurately proportioned action of a vast number of muscles.



FIG. 2.—Diagram of Muscles which maintain the erect posture. After Huxley. The muscles are—I, of the calf; II, of the back of the thigh; III, of the spine (these tend to keep the body from falling forward); 1, of the front of the leg; 2, of the front of the thigh; 3, of the front of the abdomen; 4 and 5, of the neck (these tend to keep the body from falling backwards); the arrows indicate the direction of action of the muscles, the foot being fixed.

What is it that makes them work together in this way?" If a man receives a violent blow on the head while he is standing, he falls down, and may remain senseless and limp for a long time ; all his muscles have ceased to act, and his mind is a blank, and he has no more power to do actions, either good or bad, than if he were dead. The reason of this is that the blow has destroyed for the time being the functional activity of his brain. We do not know how the mind and brain are connected, and very probably never shall, but we know perfectly well that the mind works through the brain, and that by altering the brain you may modify a man's understanding or his morals. By giving a man a lot of whisky you will muddle his brain so that he is incapable of understanding what is told him, although his life or death may depend upon his intelligence. By a large dose of opium or chloroform you may render him senseless, helpless, and as unfeeling and unresisting as a dead man, and by haschish you may render him temporarily insane. A blow on the head, as I just said, will make a man senseless for the time being, but if it is not so severe as to damage his brain he will awake from his insensibility with nothing worse than a bad headache, and be as intelligent and as moral as before.

But if the blow be very severe it may affect his mind in very curious ways. In one of my patients, a man who was thrown from a horse and got a deep indentation in his skull, seven years were cut out of his life. When he was thrown from his horse he was a stockbroker in active work with a wife and several children, but when he awoke from his unconsciousness he had practically lost seven years of his life. He believed himself to be a student at college. He never regained this seven years, he had to be told by others who he was and to be introduced to his wife and family, who were then to him total strangers.

But a man's moral nature may be influenced permanently by an injury. There was a man named Gage, near Boston, in America, who was engaged one day in ramming a charge of powder into a rock. The powder exploded, and the crowbar he was using, which was 3 feet 7 inches long and $1\frac{1}{4}$ inches in diameter, was driven right through his head, entering beneath his

lower jaw and coming out at the top of his head. Wonderful to say, he recovered from the injury, and lived for $12\frac{1}{2}$ years afterwards, but from that time onward he was a changed man. He had previously been a foreman, very steady and trustworthy, energetic and persevering, but after the accident he became lazy and erratic, drunken and profane, obstinate, yet vacillating, so that those who know him before said that he was "no longer Gage."

We see, then, from these instances, how the brain can affect the mind; we must now see how it affects the body. It is just about thirty years ago that my friend Dr. Ferrier, in a series of admirable experiments done at the West Riding Asylum, showed that irritation of certain parts of a monkey's brain produced definite movements in the eyes, head, and limbs. I assisted him in a number of these experiments, and found that I could not possibly remember the order in which the movements came until it occurred to me that the centres were arranged in the order necessary for obtaining food, and the easiest way to remember them is to take the story of Adam and Eve. I must premise that each side of the brain directs the actions on the opposite side of the body. When centre No. 1 (Fig. 4) is stimulated the eyes and head turn to the opposite side just as when Eve looks at the apple, No. 2 causes extension of the arm and hand, and contraction of the fingers in the act of taking by the action of it, by the exercise of centre No. 3 she brought it to her mouth, by that of No. 4 she ate it (movements of the lips and mouth), by No. 5 she threw away the seeds, while Nos. 6, 7, 8 regulate the movements of the foot, legs, and trunk in going to get another for Adam. Although the position of these centres was discovered by experiments upon monkeys, yet cases of disease of the brain have shown that their position is nearly similar in man.

It has been found that when a man has lost an arm or a leg, the centre in the brain corresponding to it wastes, so that it is evident that while the brain acts upon the body in producing movements, the body also reacts upon the brain, and there can be no doubt that, just as the absence of a limb causes wasting of the corresponding part of the brain, so movements and



FIG. 3.—Adam and Eve.



training of a limb develop the corresponding nerve centres in the brain.

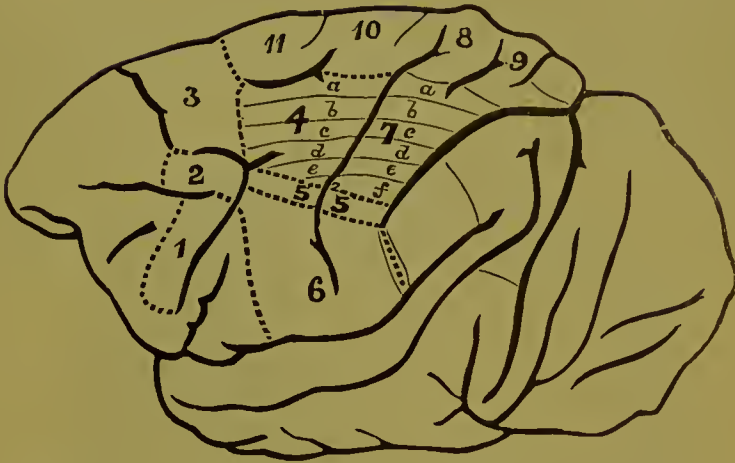


FIG. 4.—Diagram of the Motor Centres in the Brain, modified from those of Ferrier and Horsley. The motor centres have been numbered so as to represent the successive actions in seeing, taking, and eating the apple, &c. 1, Eve sees the fruit (eyes turn to opposite side); 2, looks more eagerly at it (head and eyes turn); 3, turns towards it (head to opposite side); 4, puts forth her hand to take it (*a*, movements of shoulder; *b*, of elbow; *c*, of wrist; *d*, of fingers); 5, luxuriously shuts her eyes, so as to enjoy the sweet morsel more thoroughly; 6, eats the apple; 7, picks out and throws away the refuse (*d*, movements of fingers; *e*, of index; *f*, of thumb; *a*, *b*, *c*, as in 5); 8, 9, 10, 11, goes and gets another for Adam (8, movements of hallux; 9, of small toes; 10, of knee and ankle; 11, of hip).

One of the most important parts of training is exactitude. I have heard of a man who was asked how he made his fortune, and he said, "he made half by attending to his own business and the other half by leaving other people's alone." There is a great tendency amongst many people to do just the reverse of this, to attend more to other people's business than is either necessary or advisable. The same thing occurs in the brain, and when any movement is attempted for the first time, the nerve centres are liable to act in a confused manner, and not only to set too many muscles in action but to make them work violently and be in each other's way. If you watch a child learning to write you will see this well. A person who has learned to write usually uses his fingers gently and, to a slight extent, his hand. He holds the pen with the least possible pressure and allows it to

travel easily over the paper. But a child grasps the pen so firmly that you will see the fingers yielding under the pressure, so that their joints bend inwards, and the hand and even the arm are often quite rigid from the contraction of opposing muscles. Not only is this the case, but children very often stick their tongues out of their mouths, a motion which, as

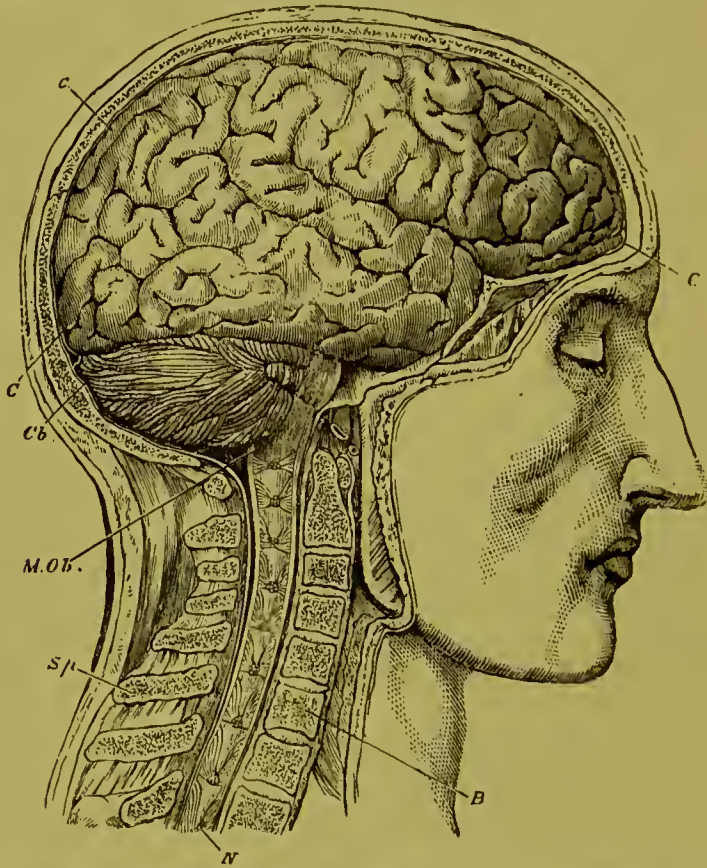


FIG. 5.—A Side View of the Brain and Upper Part of the Spinal Cord in place, the parts which cover the cerebro-spinal centres being removed. *CC*, the convoluted surface of the right cerebral hemisphere; *Cb*, the cerebellum; *M. Ob.*, the medulla oblongata; *B*, the bodies of the cervical vertebræ; *Sp*, their spines; *N*, the spinal cord with the spinal nerves. After Huxley (by kind permission of Messrs. Macmillan and Co.).

Dr. Ferrier has shown, is due to the stimulus of the nerve centres for the fingers travelling over to the neighbouring one for the mouth. By slow degrees the nerve centres become trained, each to do its own work and, what is very important, they learn not only to cause the proper muscles to contract but

to make the opposing muscles relax, so that they do not interfere with one another's action.

The difference of the untrained and the trained brain is like the difference between a mob and a fire brigade. When the alarm of fire is raised and a mob rushes round the blazing pile, most of them do not know what to do and they get into one another's way, but in the fire brigade every man knows exactly where he ought to be and what he ought to do, and he does the best thing possible to gain his end. A similar difference exists between the actions of the muscles when set in action by

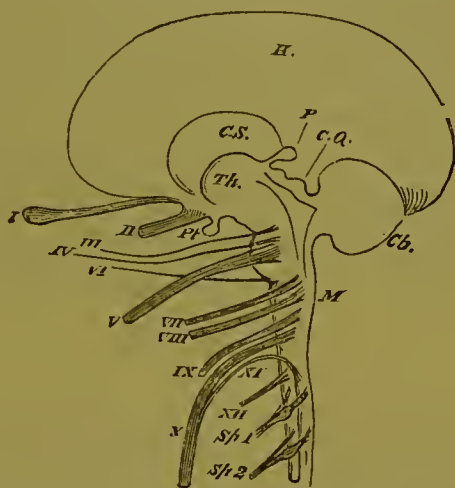


FIG. 6.—Diagram of Brain, Basal Ganglia, Medulla Oblongata, and Nerves. *H.*, the brain; *C.S.* and *Th.*, basal ganglia (corpus striatum and optic thalamus); *Cb.*, cerebellum; *M.*, medulla oblongata.

untrained and trained nerve centres. At first all movements are difficult, walking as well as writing, and so long as they are directed by the voluntary nerve centres in the brain itself, they are slow. But after a while the higher centres in the brain or cerebrum pass on the work to what are called the basal ganglia, which are lower down, and are connected with the muscles by means of the spinal cord and nerves. These gradually learn to do the required actions without our being really conscious of them, so that while we are walking and writing, our attention may be completely occupied with other things—with the scenery through which we are passing or with thoughts of the friend to whom we are writing. When movements have

been learned to this extent they are not only easier but quicker than before, and perhaps no better example could be given of co-ordination by the eye, the arm, the body, and the legs all working well together than in games of cricket, lawn tennis, or polo, where the course of the ball must be followed, its speed estimated, and the movements of the body adjusted so as to meet it with the bat or catch it with the hand.

The same process that occurs in writing, walking, or cricket takes place in the nerve centres in anyone learning a trade, so that a man who may afterwards become a most skilful workman is at first a clumsy apprentice and may spoil more than he makes. The nerve centres are more easily trained in youth than in adult age, and therefore careful training in youth is one of the necessities for the good work in adult life which will secure a man from falling into the ranks of the unemployed. But there are many trades in which, however good a man's brain may be and however dextrous his fingers, he is of little use unless he has got a good deal of muscular strength. Now, it is a property of the muscles that they grow stronger by use, and if we were to take a couple of youths of the same age from a clerk's desk and the same number from a blacksmith's shop, we should probably be able easily to tell their occupations by simply feeling the thickness of their arms. Yet it might be that if we felt the legs of these youths, those of the clerks might be larger and stronger than those of the blacksmiths, because in their spare hours they went in for running or other games which strengthen the legs. It is one of the disadvantages of many occupations that certain sets of muscles are brought into action and others are left undeveloped, and one of the objects of systematic exercise is to develop all muscles equally. The extent to which it is advisable to do this is shown by the success with which the Swedish, Sandow's, and other similar systems have been attended, and there can, I think, be little doubt that such exercises as they recommend would do much good by strengthening the youths of this country if they were more generally employed than at present. But when muscles become over developed, although useful to men who are lifting weights, they rather interfere with the rapid action which is



FIG. 7.—Hercules.



FIG. 8.—Apollo.





FIG. 9.—Athlete.



FIG. 10.—Dianna.



FIG. 11.—Gladiator.



FIG. 12.—Runner.

really more serviceable to a man in general life, and what we wish to obtain by training is not so much the heavy body of a Hercules as the strong yet agile frame of a Mercury, boxer, disc thrower, runner, an Apollo, or a gladiator. Hercules might do very well as a coal-heaver, but where would he be in the cricket field? Great strength is often much less useful than power of endurance, which depends on strength and development of the heart and respiratory power.

For this reason I think that systematic physical exercise, such as that of the modern Swedish system, should form a part of the regular curriculum in schools, but in addition to this I think it is necessary to make ample provision for games, and, if possible, games in the open air. On this account playgrounds should be looked upon as quite as essential as schoolrooms. I have said that exercise tends to increase the size and strength of muscles, but this is only true if the muscle is well nourished. If the individual be badly fed, exercise, instead of producing increased strength causes the muscles to become thinner and feebler. It is therefore most important that growing children should be well fed. The question of how this feeding is to be accomplished is a most difficult one, for, on the one hand, it is evident that the increased physical exercise which is so highly desirable for training both the muscles and nerve centres, and thus producing a more perfect man, demands more food than would otherwise be required, and which ought to be supplied in sufficient quantity and of proper quality. But who is to pay for it? It has been said to me that it would be cheaper for the ratepayers to supply food gratis to children who require it, and thus enable them to grow up with sufficient strength and energy to become good workmen, and to prevent them falling upon the rates afterwards, rather than to pay for them perhaps during a great part of their lives, and certainly maintain them for a number of years in their old age. It may be said, also, that as the State has determined that children must be educated, and has provided the machinery for educating them, if necessary, at the public expense, the State should likewise provide the food which the child requires in order to enable it to learn and thus to profit by the elaborate educational machinery which the State

has provided. There may be some truth in both these arguments, but, on the other hand, it is certainly inadvisable to lessen the responsibility of parents towards their children, and at the same time it is not fair to throw the burden of feeding the children of the drunken, thriftless, and lazy upon the steady, saving, and hardworking, who have often enough to do to bring up families of their own. Perhaps the best course to be followed might be to have luncheon bars, or *cantines scolaires*, as Dr. Maenamara calls them, either in or near each school. At these bars meals might be supplied to the children of a cheap, nourishing, and appetising kind, and as they would be provided on a large scale, the cost of production would probably be less than if they were cooked at home. They ought not to be sold to the children for money, because children would be tempted to go without nourishing food and to spend their pence in a pastrycook's or sweet-shop. They should be given in return for tickets, which those parents who could afford it should buy, and which might be given by charitable people or societies, or even by the guardians of the poor, to children whose parents were quite unable to pay for them. The preparation of so much food would give much greater opportunities than at present for teaching the girls practical cookery, and they would not only prepare the food, but taste it themselves afterwards. In some places where this is done I believe the girls are also taken to the markets, so that they may learn what food costs and how to buy it. The teachers also show how they can get the most nutritious food for the least money, and how to present it in the most appetising form. It seems to me that with such training for the schoolgirls, who will in ten years more be the wives of our artisans and the mothers of their families, is one of the most valuable means of securing the maintenance of our industrial supremacy by enabling our workmen to get the greatest nourishment and most comfort out of the smallest wage, and thus, if needs be, to meet our Continental rivals on their own ground, and turn out work as good, or better, than theirs at even a lower price. One may hope, too, that the training which the girls receive in this way may perhaps react upon the mothers at home and lead to better cooking than before.

But it is not simply the food which we put into the body that nourishes; it is that portion of it which is assimilated and digested. Now the first part of digestion is mastication, and many children cannot masticate thoroughly on account of the defective condition of their teeth. Others cannot take their full share in games without harm, because their hearts or lungs are feeble or diseased, and others, again, suffer from headaches or are punished for stupidity because they cannot see clearly the books that are given them to read or the figures drawn upon the blackboard. In order to prevent the mischief and suffering which results from these defects not being recognised, *some system of medical inspection in schools is absolutely necessary.*

I have spoken already of the exercises which enable the various parts of the body to work harmoniously together, but something more than this is wanted to perfect the man. He must be able to work along with others. The drill which a team for football, cricket, or boating gets from its captain or coach is very thorough, so that each one must work in perfect harmony with the others, or else he will spoil the match.

But such drill is for the favoured few who are selected to form part of the team, and we really need to have some kind of drill for all children—not so perfect, perhaps, as the kind of training about which I have just spoken, but still enough to teach them how to work together in harmony, and to obey readily the word of command. Such training is useful in every occupation, and the habit of obedience in boyhood increases the efficiency of a man in later life in almost any walk of life. There is a critical time, too, in a boy's life when he is just emerging from the discipline of home or school, and has not yet entered upon the duties and responsibilities of a man. It is very important, I think, at this time that his attention should be engaged with such occupations and amusement as will keep him from evil ways and tend to his development in the right direction, and amongst these occupations I regard Volunteering as one of the best. I most sincerely trust, therefore, that the Government which has just come in will, to the utmost of its ability, aid Volunteering in all its branches, and will recognise not only full-grown Volunteers, but boys' brigades of all sorts.



FIG. 13.—A Constitutional Walk. “An Agreeable Duty” (after Leech).—*Punch*, March, 1848, vol. xiv, p. 124. (By the kind permission of the proprietors of *Punch*.)



FIG. 14.—Croquet. “A Nice Game for Two or More” (after Leech).—*Punch*, August 17, 1861. (By the kind permission of the proprietors of *Punch*.)



FIG. 15.—Lawn Tennis. “A Modern Tournament” (after Du Maurier).—*Punch*, September 3, 1881. (By the kind permission of the proprietors of *Punch*.)



FIG. 16.—Polo. “The Lists at Hurlingham” (after Du Maurier).—*Punch*, July 24, 1886. (By the kind permission of the proprietors of *Punch*.)

For girls we want clubs where they shall be able to meet together and enjoy social conversation, instead of being thrown together with boys and youths in the streets, and thus, to a certain extent, early marriages, which are so productive of unhappiness at home and of feeble offspring, may be prevented.

I have been talking hitherto of boys and girls, but, as some one very pertinently said to me, there will be no boys and girls to teach and to train if the babies all die off in infancy. This is very true, and the appalling mortality of infants is one of the subjects that requires the immediate attention of the nation. Efforts are being made everywhere throughout the country to lessen this mortality, and the Health Department of Sheffield has issued advice on the feeding and rearing of infants for the use of mothers which is likely to be very useful. To quote from this, "An enormous number of children die every year in Sheffield from diarrhœa, more especially in the months of August and September, and it is quite certain if they were fed and reared according to the directions given, and were not given sour milk and other quite unsuitable food, and at the same time their clothes and their homes were kept clean, the majority of these infants would not die."

In August and September it is sometimes very difficult for mothers, however careful they may be, to obtain good milk and prevent it from turning sour before it is administered to their children. Efforts must therefore be made to ensure a sufficient supply of good milk to towns, and if possible milk which is not prevented from turning sour by the addition of preservatives, but milk which is kept absolutely free from contamination from the time it leaves the cow to the time it is given to the child. Efforts to obtain this are being made in Liverpool, Glasgow, and elsewhere, and ought to be made in every town throughout the country. But one town does not always know what another town is doing for the prevention of infant mortality and the successful rearing of children and youths. It is therefore very important that all the successful methods adopted in one part of the country should be known in every other, so that like success shall be everywhere obtained. This does not apply merely to the question of infant feeding or to the question of milk, but to

the care of mothers during pregnancy and childbirth, to the care of children, to feeding in schools, to classes of cookery, physical training for boys and girls, and in fact for every agency that may tend towards the object which I mentioned at starting, namely, the rearing of a race of healthy babies, sturdy children, and strong and healthy men and women in place of the feeble folk who constitute the unemployed at present. Amongst the richer classes in this country there seems not to be a deterioration, but an actual increase in the strength and vigour of the race. The girls are much taller and more athletic, men live longer and work to a greater age, and part of this increase is probably due to the greater amount of physical training—that exercise that has become general, especially amongst women, of late years. There is probably no more trustworthy mirror of our nation's life than the pictures from *Punch*, and those which the proprietors have kindly permitted me to use depict the growth in strength and agility corresponding to more active games amongst women. It is the object of the National League for Physical Education and Improvement that the same development of strength and physique that has occurred amongst the richer classes of this country should occur also among the poorest, and for this reason I ask that you will take the League to heart and establish a branch of it here.

INFANT MORTALITY, NATIONAL LOSS, AND THEIR PREVENTION.

*Address delivered at Bristol on February 12th, 1906. The Lord Bishop of
Bristol in the Chair.*

By Sir LAUDER BRUNTON, M.D., D.Sc., LL.D. Edin., LL.D. Aberd.,
V.-P.R.S.

MY LORD BISHOP, LADIES, and GENTLEMEN,—There is, perhaps, no more pathetic story in history than that of the “Massacre of the Innocents.” Herod sent his men of war to the little isolated hill-town of Bethlehem and slew there all the children from two years old and under, tearing the infants from their mothers’ arms and murdering them before their mothers’ eyes. The horror of the scene appals us, and yet the true pathos of it is rather to be found afterwards, for we read :—

“In Rama was there a voice heard, lamentation, and weeping, and great mourning, Rachel weeping for her children, and would not be comforted, because they are not.”

Dreadful as this tragedy was, it is nothing to what is being enacted now. Every day more children die in this country than were slain at Bethlehem by Herod. They die from ignorance, carelessness, or injurious sanitary surroundings, and this slaughter of the innocents is not enacted once, but is repeated day by day, week by week, month by month, and year by year. Surely it is time that we were up and doing and preventing this dreadful destruction of infant life. Nor is this all; perhaps this is not even the worst of it. Herod slew the children right off, but here, while even a greater number are slain daily, many survive, crippled in body or mind by disease, feeble in physique, feeble in intellect, and they grow up incapable of taking their proper part in life, which is, to some of them, only a long-continued martyrdom. They throng our out-patient rooms, they fill the wards of our hospitals, they are accommodated in our poor-houses, infirmaries, and asylums. Others are so feeble that when they attempt to enter the Army as

recruits they are rejected, because they do not come up to the necessary standard, and, as I have asked already in a letter to the *Lancet* nearly three years ago,* “if these men are unfit for military service, what are they good for?” They go to swell the ranks of the unemployed who either cannot work or will not work; they increase the rates, which are already so heavy, and the industrious must pay for the idle. There are yet others, who grow up apparently strong in body, but from want of good training their morals become deteriorated, and they join the criminal class and prey upon their fellows.

What is to be done to stop this waste of human life, human energy, human intellect, and work? Almost everyone deplors it, and very many are trying to remedy it. Perhaps there is no country in the world where there are so many benevolent institutions as this, and yet the condition remains. Why is this so? It is, I believe, to a great extent because these various institutions are all working at their own particular object, without regard to what others are doing, without co-operation, and very often with a certain amount of jealousy lest the success of another scheme should interfere with their own. The way in which they regard the life of the nation reminds me of the story told of his grandfather by P. T. Barnum, the celebrated showman. Barnum’s grandfather was also a showman, and made a good deal of money by showing an elephant, which was then a great rarity, round the United States. After a while, becoming tired of the business, he determined to sell his interest in the animal to another man, who showed it round also, but when the time came for the division of the profits, and Barnum asked for his share, he was told there was none. “Why so?” said Barnum. “Because the animal has eaten up all the profits,” was the answer. Barnum said nothing more at the time, but next morning when his partner arrived in the elephant’s stable to give the animal its breakfast, he found Barnum standing there with a loaded rifle. “What are you going to do with that? Are you going to shoot me?” said the partner. “No,” said Barnum, “I am not going to shoot you, but you see this beast is eating up all the profits; you can do

* *Lancet*, February 14, 1903.

what you like with your half, but I am going to shoot my half." This brought the partner to reason, and he purchased Barnum's share of the animal as well as his own, and then things went smoothly again.

In the same way, if we are to succeed in improving, as a whole, the physique of the nation as we should like, we must treat it and all its parts together and not merely one, here and there. As an example of what I mean, I may instance the case of consumption. We build hospitals and sanatoria for its treatment and, if possible, its cure, but till recently we have made no attempts to prevent it, and have allowed consumptive patients to go about spreading the disease, not only in their own homes but elsewhere. Now an attempt is being made by the medical men at the Brompton Hospital to prevent phthisical patients from doing this. They desire to follow the patients to their homes, to examine the relatives in order to ascertain that they have not already been infected, and that they too are not likely to spread the disease. They make arrangements for disinfesting houses and disinfecting the sputum of the patients and the rooms in which they have been living.

But one of the triumphs of modern sanitary science is the discovery that many people carry with them the germs of diseases such as diphtheria, pneumonia, and typhoid fever, without presenting any symptoms of the malady, and, therefore, if they spit in a public place and the sputum becomes dried and carried by the wind into the nose or mouth of some chance passenger, he or she may catch the disease and die of it. It is, therefore, not merely the sputum of persons suffering from phthisis that is dangerous, for the sputum of persons apparently healthy may convey disease. Spitting in public places ought, therefore, to be prohibited by law, but such a law cannot be passed unless we get the co-operation of the whole of the community, and this we cannot obtain until they know the dangers to which the habit of spitting exposes them.

The facts which I have just mentioned show that something more is wanted for the development of a disease than the mere presence of its germs, viz., that the soil upon which they fall

must be susceptible. This was shown in the Brompton Hospital for Consumption, where the nurses almost never took the disease, although constantly exposed to infection, but they were strong and healthy. If we can breed a strong and healthy race of men, women, and children, we shall tend to lessen the incidence of disease and, consequently, not only the expenditure upon hospitals, but the enormously greater loss caused by the inability of these sick people to do their proper work.

But, how is this to be done ?

To attain this object children should be better fed, and as the Right Hon. John Burns has truly said, their mothers should drink less tea and their fathers less spirits. In addition, however, to this a great deal can be done by proper physical training. The part of the lung which is first affected by tubercle is usually the apex ; that very part which is least used. By proper respiratory exercises the chest can be developed, the capacity of the lungs increased, and their tendency to disease diminished. Not only so, but the heart can be strengthened so that the circulation becomes more powerful, the amount of warmth formed in the body is greater, the power of resistance to cold is increased. The limbs become firmer and the muscles stronger, and at the same time their movements are more readily subordinated to the nerves, they fulfil more exactly the intention of their owner, and thus enable him not only to put out more work but better work. The nerve-centres improve along with the muscles, the mind, the emotions, and the will become better regulated, and a physically-trained child or youth becomes a better member of society. Exercises, drill, and play are all most important for obtaining this end. Their importance is becoming recognised generally, and the Board of Education is taking up the question of the teaching of physical training in schools throughout the country ; but who is to teach the teachers ?

There are a few training schools at present, but they are insufficient to supply the demand that will arise if physical training becomes universal. For this purpose there must be some national central institute for physical education with a

trained examining body, which must have authority to issue diplomas without which no person should be allowed to teach. In this way unity will be established throughout the country, and we shall get the best possible training in every part of it.

The establishment of such an institute was proposed by Miss Theodora Johnson in November, 1904, and the proposal is now beginning to take definite shape. But all children are not alike, and the physical exercise that is barely enough for one is enough to exhaust and injure others, and I have known cases in which the heart has been seriously damaged by overstrain. It is, therefore, absolutely necessary that there should be an examination into the physical condition of children, so as to ascertain how much they can do with advantage and without injury. Nor is it only the heart and lungs that need to be inspected; the teeth, the nose, the eyes, and the ears should all receive attention. Part of this work must be done by medical men, part of it may probably be done by teachers who have received the necessary instruction. How much requires to be done and must be done by one or the other is a matter of detail which must be worked out later on.

Time will not permit me to enter into the question of playgrounds, games, provision of glasses, division of children into classes according to their powers, feeding of children, training in cookery, continuation classes, drill, and volunteering. All the children should be made to learn the general laws of health, the evils of spitting, the use of fresh air with avoidance of chill, the care of the teeth, and the mischief that may be done by tobacco and alcohol.

The improvement of the health and physique of the nation is a very complex problem. It needs the co-operation of everyone, and, especially, it requires the co-ordination of all the bodies already working to attain the end. Many of these bodies are not even known to one another, and in order to ensure their co-operation, a National League for Physical Education and Improvement has been founded. The object of this is not to interfere with any body now working for the good of the people, but to make them known to one another, to help them in their work, and to initiate such work in those

parts of the country where no such work is being at present done. By this means we hope to save the babies, to help the children, to train the youths, to raise up a race of sturdy men and women, and to lessen the number of the diseased, the feeble, the unemployed, and the criminals. The burden of taxation which this country has now to bear—imperial, national, and local—is very heavy. It shows no signs of growing lighter, and every effort to lessen it ought to be welcomed. On this ground, therefore, as well as on the higher grounds of patriotism and humanity, I believe that the National League for Physical Education and Improvement ought to commend itself to everyone in the country.

NATIONAL LEAGUE FOR PHYSICAL EDUCATION AND IMPROVEMENT.

DEPUTATION TO THE RIGHT HON. AUGUSTINE BIRRELL,
REGARDING MEDICAL INSPECTION AND TEACHING OF
HYGIENE IN SCHOOLS.

Mr. Birrell, President of the Board of Education, received in private in his room at the House of Commons, February 27th 1906, a deputation from the National League for Physical Education and Improvement. Mr. Compton Rickett, M.P., and Sir Henry Craik, M.P., introduced the deputation, which included the Bishop of Ripon, the Bishop of Southwark, Sir Lauder Brunton, Professor H. Marsh, of Cambridge, Miss Alice Ravenhill, Mrs. Scharlieb, M.D., and the Secretary.

In the course of their interview Sir Lauder Brunton spoke as follows :—

SIR,—We thank you for your courtesy in receiving us as a deputation from the National League for Physical Education and Improvement. I may also thank you in the name of the Second International Congress for School Hygiene, of which I am in the meantime President, for the action taken by the English Government in regard to school hygiene will greatly influence not only our Colonies but foreign countries.

If you will allow me I will begin by giving a short account of what the League is not, and of what it is. It is not, as many people think, intended to displace or interfere with the work of any society or individual at present working for the physical welfare of the people, but it is intended, as some one well put it, to bear the same relationship to them that a clearing house does to a bank. It is intended to combine them together, and to enable them to co-operate by making them

known to one another, by ascertaining how their work can best be supplemented, to extend it to districts where it does not exist, and to bring voluntary agencies into relation with municipal and other authorities and the Legislature so that the combined action of all three may effect for the good of the country what none of them can do alone. The scope of the League is therefore very wide. It hopes by a combination of these agencies to lessen infant mortality, to breed up a healthier race of children, to instruct parents, to improve the housing of the people, and to remove the acknowledged evils the existence of which was admitted by the Physical Deterioration Committee. We have come to you to-day, Sir, not to bring before you anything new, but to urge that the admirable recommendations made by the Royal Commission on Physical Training for Scotland, by the Physical Deterioration Committee, and several Interdepartmental Committees shall be carried into effect. The Physical Deterioration Committee were unable from want of data to say that actual deterioration exists, but there is certainly a great deal of physical inefficiency, especially amongst the poorer classes of this country. The richer classes, on the contrary, with abundant food and more physical exercise than was formerly in vogue, have apparently increased in stature and strength, and this is more especially marked amongst girls. What we desire is that the children of the poor should have the same chances in life as those of the rich, by having their bodies improved by feeding where necessary and by physical training, so that they may be able to utilise, in the struggle for existence, the mental training which the State has already decided to be necessary for every child throughout the country. The basis upon which all physical training must be founded, is acknowledged in all the Bluebooks issued on the subject to be medical inspection. I have therefore to bring before you this resolution that the Council of the National League for Physical Education and Improvement are strongly of opinion that the medical inspection of children in all schools and colleges should be compulsory and under the control of the Central Authority. Efficient medical inspection of schools at present exists in comparatively few places. There

is at present a doubt whether a medical officer can inspect a child, unless by the express permission of the parents, without rendering himself liable to an action for assault. We trust that the present opportunity afforded by a new Education Bill will be utilised so that medical inspection shall be universal, and that the training, both mental and physical, to be given in the schools may be beneficial and not harmful to the child. The State has already recognised the necessity for classifying children according to their mental powers, and separating the feeble-minded, who are subjected to a different system of training from the others. But it is also desirable that those who are defective in sight, hearing, or body generally should also be classified and the training adapted to their needs. This can only be done by medical inspection. Every school earning a grant should be required to return, in Form 9, the name of a school medical officer as well as the name of an official correspondent as a condition of the grant, and this officer should not be dismissed without the sanction of the Board. In order to ensure a certain amount of uniformity of medical supervision throughout the country there ought to be medical inspectors appointed by the Board of Education, and as technical questions are sure to arise in connection with the subject, the Board should have a Central Advisory Committee of medical men to deal with them. The necessity for universal medical inspection of school children is the fundamental proposition which we wish to bring forward, because without it other reforms can only be imperfectly carried out. But we do not wish this opportunity of other reforms to be neglected.

The necessity for physical training as a part of education has been already acknowledged by the Board of Education, and the Bluebook on a Model Course gives directions as to how this training should be effected. If such training is universal, however, there will be a large demand for trained teachers, a demand which the present Training Institutes for Physical Culture throughout the country will probably be unable to meet. Here the National League hopes to be of assistance, and a Committee of this League is now considering the formation of a Central Institute for physical training which may not

only supply the necessary number of teachers, but create uniformity throughout the country by a system of examination and certificate, but here co-operation between the League and the Board of Education is necessary, for the Royal Commission on Physical Training consider that certificates of efficiency should be granted under the authority of the Education Department. But the Royal Scottish Commission regard games as equally important with physical drill for the development of a healthy body, and even more important for the development of a healthy mind. In Switzerland games are regarded as a part of physical training, are inspected by teachers, who see that horseplay is avoided, and that the weaker, who are most in want of physical training, shall not be driven to the wall by the stronger. But games require playgrounds, and it is essential that provision should be made by local authorities for sufficient playgrounds, as well as for covered sheds or other places where exercise may be taken in bad weather. We think that the action already taken by the Education Committee of the London County Council in opening playgrounds after school hours, provided proper supervision can be assured, might with advantage be extended throughout the country, and we would welcome any legislation which would lead to this. We recognise the difficulty of such inspection as involving greater expense to the ratepayers, and we believe that by the co-ordination of voluntary effort which the League hopes to ensure, this difficulty will be overcome. We wish to draw special attention to Rec. 47 of the Physical Deterioration Committee to the effect "that lads should be made to attend evening continuation classes in which drill and physical exercises should take a prominent place," exemption being granted to enrolled and efficient members of such clubs and cadet corps which have been submitted to inspection, and conform to the regulations qualifying them for public aid. Encouragement of such clubs, which the Committee here recognise, is so closely connected with physical education that the power to aid them by grants from the Treasury might perhaps properly form a part of an Education Bill. One of the great objects of the National League is to fulfil the wish

expressed by the Physical Deterioration Committee in the Report, Rec. 48, page 92, that:—

“In order to organise existing efforts on a comprehensive and effective basis, the Committee would like to see a central body, in touch with municipal activity, established in every large town, and charged with the duty of supervising and directing voluntary agencies with a view to bringing them up to a minimum standard of efficiency.”

The feeding of children is a matter of essential importance, for to increase the work, either mental or bodily, to be done by a starved child is cruelty instead of kindness. The League thinks that provision should be made for the feeding of children, but at the same time it is very anxious not to increase the burden of the ratepayers or to lessen the sense of parental responsibility. It hopes here by the co-ordination of voluntary agencies to render essential service to the Board of Education. (Report, paras. 85 and 86, p. 19.) The training of girls in cooking is of the utmost importance and a system of feeding in schools might afford opportunities for girls not only to learn how to cook, but to taste what they have cooked. They should also learn how to buy food and how they could get the most nutritious and agreeable food at the least possible expense.

Before concluding I would again refer to the enormous sacrifice of infant life which so impressed the Committee on Physical Deterioration. (Report, Rec. 29, p. 89.) The real remedy according to them lies greatly in the hands of the Education Department, for they say it “Is to be sought in that social education by means of which at first in the school and afterwards ‘elsewhere’ the foundations of maternal competence may be laid.” (Report, para. 277.) We therefore urge that the teaching of hygiene in schools should be recognised as equally important with that of the three R’s, and if necessary, room may be made for it by the omission of other subjects from the school curriculum, and it should count with other subjects as a subject entitling teachers to a grant. Full information in regard to details of how the reforms that we desire may be carried out is to be found in the various bluebooks and the League will only be too glad to give you from them or from

independent sources any information that you may desire in regard to details.

If compulsory powers for the above subjects should prove at present to be inadmissible, we humbly suggest that permissive powers may be obtained which would enable each representative body to adopt compulsion or not as it pleases, together with a small rating addition necessary to make them effective.

We would humbly suggest also that the legislative power at present sought should be in advance of that which is for the time being administratively desirable, so that advance should not in the future be retarded by its absence.

Again, Sir, we thank you for your courtesy in receiving us to-day.

COMPULSORY MEDICAL SUPERVISION AND TEACHING OF THE LAWS OF HEALTH IN SCHOOLS.

(Address delivered at the Manchester and Salford Sanitary Association,
May 18th, 1906.)

By SIR LAUDER BRUNTON, M.D., D.Sc., LL.D., V.P.R.S.

MY LORD MAYOR, LADIES AND GENTLEMEN,

The subject on which I have the honour to address you to-night is that provision ought to be made in the Education Bill now before Parliament for the compulsory medical supervision of all public elementary schools and the teaching of the laws of health. This subject was to have been introduced to you to-night by Mrs. Tennant and she has asked me to express to you her profound regret that she is unable on account of family bereavement to attend to-night. I know that you will all deeply sympathise with her in her loss, and we all feel, though probably none so much as I, the loss you have sustained by her absence, and by my having to take her place, because the address she would have given you would have been very much more eloquent and effective than I can give. Yet the subject is one of such vast importance that I feel that it must commend itself to you however feeble and imperfect the mode of presentation may be. It was only the day before yesterday that I received the card of invitation to this meeting, and I was astonished to find that I was described upon it as the founder of the National League for Physical Education and Improvement. Had I seen it before it was printed I should certainly have entered a disclaimer, for the National League of Physical Education and Improvement is to be associated with no single man. It has sprung up like the mustard plant in the parable from a very small beginning, and its growth is due to the cordial co-operation of men and women all over the country who are interested in the welfare of their fellows and are anxious to promote the health and happiness of the community. Without cordial co-operation nothing great can be effected, and it is because the power of combined effort has been realised by the Manchester and Salford Sanitary Association that it has

for nearly 50 years been able to effect so much good. I rejoice to find that it is now throwing its great power and energy into the subject of medical supervision in schools and the teaching of the laws of health not only in its own district, where it can already point to such success, but in the country generally.

It has always seemed to me that workers may be divided into three classes, the foolish, who never learn either from their own mistakes or those of others; the ordinary people, who go muddling along, making many mistakes and learning by them slowly and imperfectly, and the wise, who take advantage of the experience of others so as to avoid the mistakes they have made and to imitate their successes. I trust we belong to the third, and therefore let us look round and see what is being done elsewhere. The German Emperor, who is undoubtedly a man of extraordinary mental ability and thorough devotion to the interests of his Fatherland, has said, "Wir müssen kräftige Kinder haben," and he has hit the nail on the head, for unless the children be healthy and strong we cannot be anything more than a feeble folk, unable to maintain our position either in commerce, manufactures or war. In Berlin for a good while past, I believe they have had medical inspection of children at their entrance into school, but they have come to the conclusion that this is insufficient and that the child ought to be inspected at intervals throughout its whole school life, so as to detect morbid changes occurring during the period of growth and rectify them before they have time to develop and do harm. The town of Berlin has consequently doubled its staff of medical officers of schools, so that each officer has now six or eight elementary schools under his charge, and the scholars in these are regularly inspected. But you may say we would like to have something more to go upon than the mere example of foreign nations. How do we stand at home? Is there any real necessity amongst our population for such examination? The answer to these questions is given in the Blue Books in which the results of the Royal Commission and the Interdepartmental Committees have been recorded for the instruction of our Government. These Blue Books are those of the Royal Commission on

Physical Training in Scotland, and of the Interdepartmental Committees on Physical Deterioration, on Medical Inspection and Feeding of Children, and on a Model Course of Physical Exercise. These, one and all, insist upon the necessity for medical inspection,* and unless the Government is to stultify itself and refuse to follow the recommendations made by the men it has chosen and appointed from time to time to advise it on the subject, it must introduce compulsory medical inspection into schools. The advantages to be gained, and the mischief that can be avoided by such inspection, are fully laid down in the Blue Books to which I have alluded, but these books are not within easy reach of everyone to read, and you may be glad to know shortly what some of the advantages are which we hope to obtain by medical inspection. Public opinion appears to have decided that it is of very little use to attempt to teach children who are underfed, and provision will almost certainly be made by the Legislature for assuring that a sufficient supply of food shall be provided for children attending school. But it is not the food that is put before a child that will nourish it; it is not even the food that is swallowed, it is the food that is assimilated. If the child be out of health with no appetite, it may starve and pine with plenty of food presented to it, but which it will not take. If its teeth be decayed it may either reject the food which would nourish it, because it might cause pain in mastication, or may bolt it, thus giving rise to digestive ailments. Unless a medical officer is attached to the school, to whom such cases may be referred by the teacher, the compulsory provision of food in many cases may prove valueless. And besides this, how much unnecessary torture may small children be subjected to by decayed teeth? Let anyone of you who has suffered from toothache reflect on his or her own experiences

* *Report of the Royal Commission on Physical Training (Scotland)*, vol. i, par. 146, 150-160; *Report of the Inter-Departmental Committee on Physical Deterioration*, vol. i, Rec. 41, p. 91; *Report of the Inter-Departmental Committee on Medical Inspection and Feeding of Children attending Public Elementary Schools*, vol. i, par. 112 (1 and 7), p. 31; *Report of the Inter-Departmental Committee on the Model Course of Physical Exercises*, par. 10, p. 7.

and consider how much attention you were able to give to any subject presented to you while you were half-maddened by the excruciating pain of toothache. But it is not merely the pain or the weakness they may cause in school days that we have to consider in regard to defective teeth in children. These defective teeth grow worse with advancing years, and they very frequently form one of the chief causes of rejection of recruits for the Army, as well as of lessening the suitability of their unfortunate possessors for any occupation where bodily strength and activity are wanted. For bodily strength and activity must depend to a great extent on the power of utilising food, which acts the same part in the human body that coal does in a locomotive, by supplying the energy which enables it to work.

No less important than the teeth are the eyes. I believe very few of these who have not paid particular attention to the subject are aware that the great majority of so-called nervous or bilious headaches may be traced to some visual defect, and that the attacks of disabling pain which such headaches occasion, may, I should say in 90 per cent. of all cases, be greatly relieved or completely removed by proper glasses.

Those whose sight is good can hardly understand the condition of those whose vision is imperfect. I remember when I was at school seeing a boy caned every day for not knowing his lessons, and I am quite sure that the reason of this was that the poor fellow could not see what was on the blackboard, and that neither he nor his teacher had any idea of the real cause of his stupidity.

Another channel of instruction is the ears, and if the hearing be imperfect the child is of course at a very great disadvantage. Not only is this the case, but inflammation of the ears is a great source of danger to life, because it may lead to abscess in the neighbourhood of the ear, to inflammation of the brain and to death.

Closely connected with the ears are the back of the nose and the throat, because of the passage of the Eustachian tube from the back of the nose to the internal ear. But the condition of the back of the nose and the throat is of an importance to the

health of the child, which it is difficult to exaggerate. Children, especially weakly children, are liable to enlarged tonsils, and to adenoid growths at the back of the nose which interfere with natural breathing, with the proper pronunciation of words, and with the proper development of the chest. From this imperfect development of the chest the amount of air that can enter it is limited in quantity, but a great deal can be done to increase it by teaching children the proper method of respiration. But this condition of the nose seems to tell not only upon the lungs, but also upon the brain, and in regard to this I may quote from Professor Osler.* He says, "The influence upon the mental development is striking. Mouth-breathers are usually dull, stupid, and backward. It is impossible for them to fix their attention for long at a time; headaches, forgetfulness, inability to study without discomfort are frequent symptoms of this condition in students." Unless this condition is detected by medical supervision, the children will be blamed for inattention, which is their misfortune and not their fault, whereas by proper treatment the condition may be removed, and the mental ability which the child ought naturally to have, will be restored to it.

But this is not all, because children with enlarged tonsils are especially liable to take cold, and are more subject than others to diphtheria, and thus they may form a dangerous focus from which disease may spread to their healthier neighbours. There is little doubt in my mind that the so-called "common colds" are very infectious, especially amongst children, and that children take them from one another and convey them home to their families.

Another organ which requires particular attention is the heart, and this is more especially the case if physical training and games are to become a regular part of the school curriculum. This has been pointed out by the Interdepartmental Committee on a "Model Course of Physical Exercise," p. 14, who note "that if breathlessness occurs repeatedly in a child

* *Principles of Practice of Medicine*, by Wm. Osler, M.D., Regius Professor of Medicine in the University of Oxford, 5th Edition, p. 456, D. Appleton and Co., New York and London.

it should be examined medically." But this is to a certain extent looking the stable door after the steed is stolen, for the exercises which ought to do good may have already done harm before the examination has been made. Just the other day I heard of a working man who said that he was strongly in favour of medical inspection in schools because, he said, "My only boy has had his eyesight ruined, and I am told that if it had only been discovered in time his eyes would have been saved." Now I can well imagine a case which would be still more sad. We might have a boy, "the only son of his mother, and she was a widow," ruined for life by being put through exercises which were unsuitable for him, while timely examination might not only have saved him from damage, but have restored him to health. Unless medical inspection of schools is insisted upon, the complaint of the poor widow may be joined to that of the working man, and the Legislature must take care that the complaint shall never be made against it that: "You have ruined the health of my son, who ought to have been my support in my old age."

I have just spoken of the infectiousness of colds and the danger of children spreading colds, but there are other diseases, such as diphtheria, measles, and whooping cough, which can only be checked by their timely recognition, and by breaking up the school for a while. This may to a certain extent be done by the medical officer, of health, but as the regular inspection of schools forms no part of their duties, an epidemic may have made great way before they are informed of it, and advanced so far that it is beyond their power to check it.

But while medical inspection of schools may do a very great deal to check disease and increase health in children, school life is but a small part of the life of an individual. The better health which medical inspection may insure gives a boy or girl a better chance in life than he or she would otherwise have, but in order to remain healthy they require to know something about the laws of health, and this, it seems to me, is quite as important as the three R's.

Children at school ought to be taught the laws of health, but it is no use to tell them one thing by word of mouth and

show them another by example. They ought to be taught about the air which they breathe, the food which they eat and the raiment they put on, and it is of no use to tell them of the advantages of fresh air and coop them up in a crowded school-room without proper ventilation. Children learn much more by example than by precept, and it is by showing them the proper things rather than by telling them that they will learn. Last night I was talking to Sir Henry Roscoe, who is not only well known in Manchester but who is known for his scientific eminence over the whole world, and he informed me that comparative observations had been made between the mental work done in well ventilated and badly ventilated rooms, and it has been found that bad ventilation causes stupidity. He was disposed to insist upon a compulsory examination of the air of school rooms, and would make it penal to allow more than a certain proportion of carbonic acid to be present in the air. I quite agree with him in the necessity for pure air, but instead of estimating the amount of carbonic acid, I should make it essential that the school rooms were so well ventilated that by no possibility could the carbonic acid ever come up to the penal quantity. In Switzerland classes are held out of doors during the summer, and even during the colder weather intervals are allowed between the classes, during which the children are sent into the corridors to warm themselves by running about, while the windows of the school room are thrown well open so as to ventilate the apartment.

The nutritive value of foods should be taught to the older children, especially to the girls, so that they may know how to get the maximum nutriment at the minimum expense. But here again, it is not always the most nutritious food that is actually best, because if it is not appetising it is not properly assimilated, and cookery should form part of the teaching of health.

The dangers which arise from decayed food and impure water should also be strongly insisted upon. The remarkable immunity of the Japanese soldiers from typhoid during the recent war was, I believe, due, in great measure, to the care the soldiers exercised in the water they drank. Some one said to

me that our soldiers would not have been so careful whatever their orders were, because they would not have been taught from childhood the risks of impure water.

Children should also be instructed in regard to the risk of infection from phthisis and the necessity of not spitting, for in this way infection can be so much limited that in the course of another generation this frightful disease may be almost as rare amongst us as leprosy is now.

The disadvantages of juvenile smoking and the spitting it produces may be pointed out, and they should learn also about the harm that ensues from alcohol.

It seems to me also that it would be a great advantage if the senior girls could be taught something about the care of babies, because in this way a most useful beginning might be made to lessen the frightful mortality amongst children which now exists.

Now the objection sure to be raised to these proposals is that they will involve a great deal of trouble, and what is more important, they will entail a great deal of expense, but we have to consider that not only shall we diminish the pain, the sickness and the misery that exist in this country, but by increasing its health we shall increase its wealth. By rearing up strong and healthy men and women the productive power of the country will be increased, by teaching them how to utilise their food to the best advantage there will be less waste, and there will be less expense incurred in the maintenance or cure of the sick, the feeble and the diseased. Medical inspection of children and the teaching of the laws of health in schools may increase the rates to a certain extent in one way, but it will lead to their great diminution in other respects, and it will be found ultimately that it is a great deal cheaper to spend pence on children than pounds on paupers. I have, therefore, great pleasure my Lord Mayor, Ladies, and Gentlemen in supporting the resolution for the compulsory medical supervision of all public elementary schools and the teaching of the laws of health.

ON PHYSICAL EDUCATION.

By Sir LAUDER BRUNTON, M.D., D.Sc., LL.D., V.-P.R.S.

Paper read at the Educational Section of the British Association at its Meeting at York in 1906.

THE name Physical Education is sufficient to show that it is only one branch of education, and before proceeding to study physical education in particular it may be well to say a few words about education in general. The word education is so commonly on our lips, that although we may all know, yet many of us forget, that it is derived from the Latin words "e," out of and "duco," I lead. It ought therefore to be a process of drawing out, of evolving, of developing the latent powers of the organism. It may be illustrated by what occurs in plants. An orchid grower told me that he frequently bought large quantities of dry orchid bulbs, looking like scaly, withered and dried up onions, fit only to be thrown away, but neither the buyer nor the seller knew what possibilities were contained in these bulbs. By careful attention to them, by supplying them with the proper amount of moisture and of warmth these bulbs grew and developed. Many of them turned out to be very ordinary plants, but sometimes one would produce a flower so rare and so beautiful that it would be worth hundreds of pounds. How much this country and the world in general loses by the non-development of latent faculties in men can never be estimated, but Gray, in his Elegy, has indicated the greatness of the loss, when he says of those buried in a country churchyard:

"Some village Hampden who, with dauntless breast,
The little tyrant of his fields withstood ;
Some mute inglorious Milton here may rest,
Some Cromwell, guiltless of his country's blood."

No doubt many explorers, inventors, orators, patriots, poets, and statesmen have died without their latent faculties being

developed and the world is the poorer for it. But in order that education shall fulfil its proper function, it must be a process of development of the mental faculties and not a mere process of cramming.

This is universally acknowledged in regard to classics, which are contained in the educational curriculum, not so much because they are to be of any practical advantage in after life, as that they afford a good means of training the mind. Yet the proper use of education is often forgotten, and it degenerates into a system of cramming the memory with facts and rules which interfere with, instead of aiding, the development of the higher mental faculties. Education ought to be an all round process, not limited to one faculty, whether that be of memory alone, or any other single faculty, whether it be of body or mind. The three-fold nature of man has long been acknowledged in the expression, body, soul and spirit, and in correspondence with this education should also be threefold, physical, moral and mental. The tendency of education to occupy itself with attention to detail to the exclusion of general principles occurs in all three divisions. Eighteen hundred years ago this tendency in moral education was rebuked by the greatest of all Teachers, who said, "for ye pay tithe of mint and anise and cummin and have omitted the weightier matters of the Law, judgment, mercy and faith," and at the present moment it seems strange that Christians cannot agree that Christianity should be taught in schools without admixture of dogma. The same tendency which occurs in mental and moral education will be sure to occur in physical education unless means be taken to prevent it, and in order to do this we must clearly understand what the object of physical education is and what it is not. It is not to train up our youths with enormous muscles which would be most useful to a coal heaver, or even with that union of strength and agility which we see in a circus clown or professional athlete. What we want is to train the body so that it shall be a ready and able servant of the mind and, by its complete and symmetrical development, aid in producing a symmetrical development of the brain and of the mental faculties which are

dependent upon it. For a long time the body was not regarded in its proper light, as a servant of the mind and soul, but rather as a clog and hindrance to mental and moral development, and to starve and afflict the body was looked upon as one of the best means of attaining sanctity, and disregard of the laws of bodily health has too frequently been looked upon also as an aid to mental development. All errors, however, contain a germ of truth, and those I have mentioned are no exception to the rule. For if a one-sided conception be taken either of morality or intellectuality, a one-sided development of the organism may assist its attainment. When celibacy and sanctity were looked upon as to a certain extent synonymous, starvation and maltreatment of the body no doubt helped the monastic orders to attain their ideal. If the highest intellectual ideal be to have a complete knowledge of the Greek authors, or of mediæval history, combined with a child-like ignorance of the ways of the world and matters of every day life, then a sedentary life in the study is probably best adapted to attain the object. But if we wish to have a man capable of playing a worthy part in his family, in his business, in his country or in the world, he ought to be symmetrically developed in all directions, and his training should be adapted to this end.

The connection between mind and brain, like many other things, is indicated by Shakespeare, who says, in *Othello*, "O that men should put an enemy into their mouths to steal away their brains." The connection between a limited portion of the brain and a definite faculty was indicated by Broca, who showed that a lesion of the third left frontal convolution was accompanied by loss of the power of speech; but one may, I think, very fairly regard the experiments of Dr. Ferrier on the localisation of the faculties of the brain, which he described at the meeting of the British Association in 1874, at Bradford, as the commencement of a complete knowledge of the relationship between the mind and that part of the body which we know as the brain. The mind and brain can only manifest their action through movements of parts of the body, such as the lips and tongue, eyes and limbs. Some movements are

independent of the brain, and are due to the spinal cord. Such movements are termed reflex, where the stimulus being applied to the periphery is conveyed to a nerve centre and back again through a motor nerve, in somewhat the same way as pulling a string which passes over a pulley may lift a latch and open a door. Boys at school sometimes test reflex action. Let us say A has his hand upon the desk. This seems a tempting object to B and he accordingly prods it with a pin. Almost before he feels the pin and before he fully knows what has been done A draws his hand away. This action is reflex without A being really conscious of it. We know this because in certain cases where a man has had an accident and broken his spine, the feet, on being tickled, jump as they would in an ordinary person, but the patient is quite unconscious that anything is being done to them, and he does not know they move unless he sees them do so. But a stimulus applied to the surface does not reach the spinal cord only in a healthy person, but passes on to the higher and more complicated parts of the nervous system, that is to the basal ganglia of the brain and to the brain itself. For example, A has had time to think, he resents B's prod, and if he happens to have a pin about him, he will very likely press it into B, carefully choosing the place and time where the action can best escape the schoolmaster's attention. The first withdrawal of the hand was simply reflex, but the employment of the pin demanded complete co-ordination of many muscles, thought, foresight and deliberation. The movements are carried on by the muscles, but they are set in action by the nerves, which convey stimuli to them from the spinal cord, the ganglia and the brain itself. The object of physical education is to develop each one of these organs so that it shall become most thoroughly efficient. Muscles are best developed by exercise which, however, must not be carried to too great an extent. Exercise causes the muscles to become larger and stronger, over exercise causes them to become smaller and weaker. Even the most simple actions, such as those of standing and walking, demand the combined action of many muscles to oppose and balance one another. This has been shown by Huxley, whose diagram I reproduce. The body is

supported upon the foot, but unless the muscles in front of the leg (1) contract, the legs and body would fall back, and unless the muscles of the calf contract they would fall forward. But this action of the calf muscle tends to bend the knee and in order to keep the leg straight the muscles in front of the thigh must contract. But in their turn they tend to bend the body forward on the legs, and in order to keep it straight the muscles of the buttocks and back must come into action.

At first sight it would seem as if these muscles were set in action directly by the brain because if a man receives a violent blow on the head, he at once falls senseless and limp. Yet on the other hand we all know that we stand and walk without being conscious of the effort and while our thoughts are occupied with other subjects. The reason of this is that the brain and the mind bear the same relationship to the muscles and lower nerve centres that the head of a large business does to those in his employ. Instead of himself directing the action of every workman, clerk and message-boy, he simply says to his foreman or manager

"See that this is done." The general manager in his turn directs the managers in the different departments, and they issue orders to the workmen or clerks. In the body the



FIG. 1.—Diagram of Muscles which maintain the erect posture. After Huxley. The muscles are—I, of the calf; II, of the back of the thigh; III, of the spine (these tend to keep the body from falling forward); 1, of the front of the leg; 2, of the front of the thigh; 3, of the front of the abdomen; 4 and 5, of the neck (these tend to keep the body from falling backwards); the arrows indicate the direction of action of the muscles, the foot being fixed.

muscles may be compared to the workmen, the nerve cells of the spinal cord to the managers of small departments, and the so-called basal ganglia and cerebellum to the chief managers. The voluntary centres of the brain issue their mandate to the basal ganglia and cerebellum, and these in their turn regulate the action of the spinal cord and muscles. So long as the

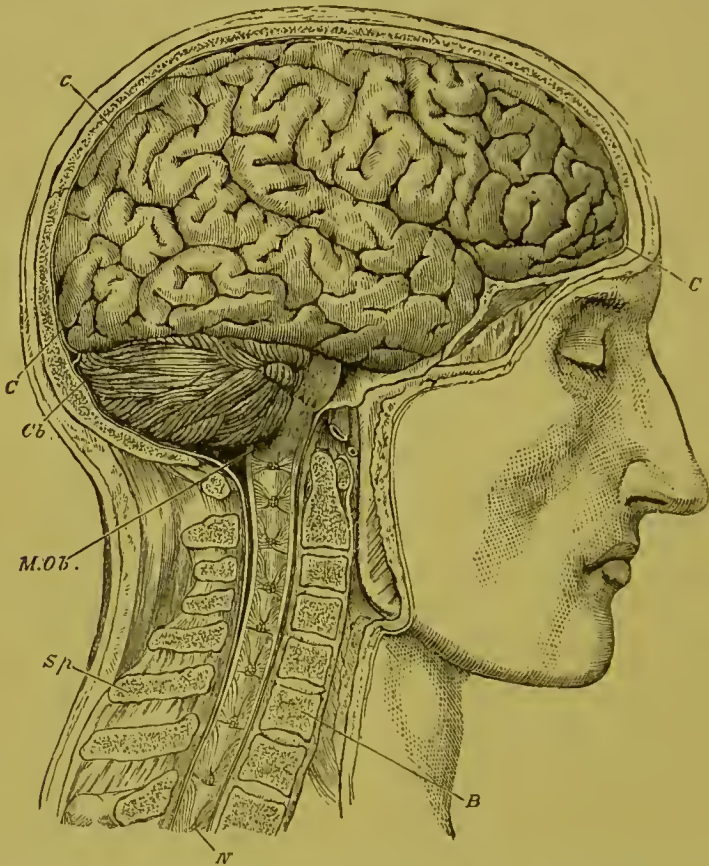


FIG. 2.—A Side View of the Brain and Upper Part of the Spinal Cord in place, the parts which cover the cerebro-spinal centres being removed. *CC*, the convoluted surface of the right cerebral hemisphere; *Cb*, the cerebellum; *M. Ob.*, the medulla oblongata; *B*, the bodies of the cervical vertebræ; *Sp*, their spines; *N*, the spinal cord with the spinal nerves. After Huxley (by kind permission of Messrs. Macmillan and Co.).

master is active every member from the highest to the lowest is kept at work, but when the master is away they cease work, with few exceptions, and when the brain is rendered inert by a severe blow, by sleep, or by the action of drugs, co-ordinated actions such as we have spoken of all cease. But in large

factories even when all the machinery is stopped it is usual to have a few men to look after the furnaces and prevent the fires dying out, as this would prevent resumption of work. In the body, even when the muscles become limp and the man is unconscious, the heart still goes on beating steadily and the chest rises and falls in rhythmical respiration. But just as in the factory neither the master nor the subordinates learn the business in a day, so it is in the organism, and the time required to educate it becomes greater as the possibilities increase to which it may afterwards attain. Thus a chicken when it is hatched will at once look round and pick up food, but the newly born babe is absolutely helpless and remains so for many months. It is those centres which ultimately attain the highest development which make the slowest progress. This is well put by Tennyson, in *The Princess*, where he describes the joyful movements of a baby on recognising its mother. "It began to dance its body and to stretch its fatling innocent arms and lazy lingering fingers." The first movements to be perfected are those of the body, which even in after life remain of a comparatively simple kind. The last are those of the fingers, which by and by may become most complicated and are most under the direction of the will. In this particular they resemble the movements of speech which are of all movements best calculated to express mental states, and which are acquired at a late period, although the respiratory movements of which they are composed are of the simplest order, and are perfectly performed even at birth. All voluntary movements are not only slow of acquirement, but they are very imperfectly performed at first. It would appear as if the will had a difficulty in selecting the proper muscles to put in action, and while trying to do this made the mistake of making several contract at the same time and interfere with one another's action. This is well seen in children learning to write, and when the movements of writing have been acquired the pen is held lightly between the fingers and moves softly and rapidly. But when the child begins, it holds the pen very stiffly and the fingers may be seen to be convulsively grasping the pen, which are often seen bent at the joints, and the wrist may be flexed

with the effort. The cause of this has been beautifully demonstrated by Dr. Ferrier, who has shown that when a stimulus to the part of the brain which would govern the movements of the fingers in the hand, is very great, it will extend not only to the arm but also to the centre for the mouth which is adjoining. In consequence of this we see children who are learning to write stick their tongues out of the corners of their mouths quite unconsciously, and as though the action would help the movements of their pen. In acquiring the power of co-ordinated action, the brain has not only to learn how to set the proper muscles into action but to limit the

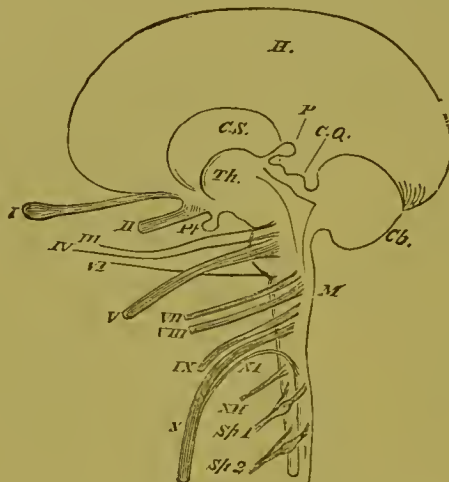


FIG. 3.—Diagram of Brain, Basal Ganglia, Medulla Oblongata, and Nerves. *H*, the brain; *C.S.* and *Th.*, basal ganglia (corpus striatum and optic thalamus); *Cb.*, cerebellum; *M.*, medulla oblongata.

stimulation to these muscles and to prevent the stimulus from spreading to others which would interfere with their action. This power of keeping muscles quiet, or inhibition, as it is termed, is one of the highest faculties of the voluntary centres. It has been investigated by Professor Sherrington and its necessity as a factor in physical training has been insisted upon by Mr. Eustace Miles. It is also one of the great points in the Japanese system of ju jitsu. Learning new movements entails constant and violent action of the cells of the brain proper, and therefore requires severe mental as well as bodily effort, but after it has been done many times the basal ganglia

become so accustomed to the regulation of the muscles that they do it unconsciously, and therefore most people stand or walk while thinking of other subjects, and with trained musicians even difficult pieces may be played with accuracy while the musician is engaged with other things and quite unconscious of the movements of his fingers. Indeed, when movements have thus become, as it is termed, automatic, the interference of the basal ganglia with the cerebrum or cerebellum may disturb their action, and in the case of a musician may lead to mistakes which would not occur if he played on without thinking. The relation of the various parts of the brain to muscular actions and sensation have been well shown



FIG. 4.—Diagram of Brain of Dog, modified from Ferrier. C.S., crucial sulcus; 1, movements of eyes, as if to see freely; 2 and 3, movements of fore-leg, and 4, of hind-leg, as in running; 5, movements of tail requisite in turning quickly, as when a greyhound is following a hare when it doubles; x x x, movements of mouth and jaws.

by my friend, Dr. Ferrier, and by others who have followed him. I acted as his assistant in many of his first experiments, observing the results while he stimulated the brain. Often as I had watched them, however, I could not remember them until I considered that they were probably arranged in a definite order for the purpose of getting food, and then it was easy to recollect them. Around a fissure in the brain, called the crucial sulcus in the dog the centres are thus arranged: paw, fore leg, hind leg, and tail, *i.e.*, the movements of the legs which would be required for chasing its prey and of the tail for turning as a greyhound does when a hare doubles. The movements of the jaw are at some distance as the jaws would usually come into

action after the pursuit had gone on for some time. In the monkey, however, the ease is different, as the movements of the hands, legs and jaw would all follow one another in regular order. The motor centres in man are arranged very much as they are in the monkey and are adapted for taking and eating fruit. One of the easiest ways of recollecting them is to take the story of Adam and Eve and follow the different actions upon a diagram of the brain, each action corresponding to a definite centre.

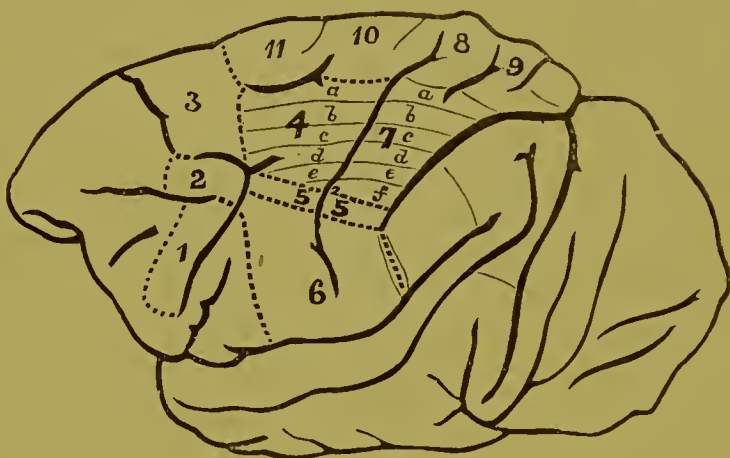


FIG. 5.—Diagram of the Motor Centres in the Brain, modified from those of Ferrier and Horsley. The motor centres have been numbered so as to represent the successive actions in seeing, taking, and eating the apple, &c. 1, Eve sees the fruit (eyes turn to opposite side); 2, looks more eagerly at it (head and eyes turn); 3, turns towards it (head to opposite side); 4, puts forth her hand to take it (*a*, movements of shoulder; *b*, of elbow; *c*, of wrist; *d*, of fingers); 5, luxuriously shuts her eyes, so as to enjoy the sweet morsel more thoroughly; 6, eats the apple; 7, picks out and throws away the refuse (*d*, movements of fingers; *e*, of index; *f*, of thumb; *a*, *b*, *c*, as in 5); 8, 9, 10, 11, goes and gets another for Adam (8, movements of hallux; 9, of small toes; 10, of knee and ankle; 11, of hip).

Hearing, sight, and sensation are located in the various tracts of the posterior part of the brain shown in the figure, while the higher mental faculties are probably more closely connected with the anterior lobes. Injury to various parts of the brain, such as may be caused by a severe blow or by the bursting of a blood vessel, or by stoppage of the circulation through a clot, may destroy one or two faculties while leaving

others intact. Thus the power of writing may be destroyed by injury to the second frontal and the power of speech by injury to the third frontal convolution on the left side in a right-handed man, while the power of the arm and leg may be destroyed, or hearing or vision may be lost by destruction of the corresponding portions of the brain. Nor is it only the physical or mental powers that may be injured by the lesion of a brain. The same may occur in the moral character. This is well shown by the famous crowbar case. A man named Gage,

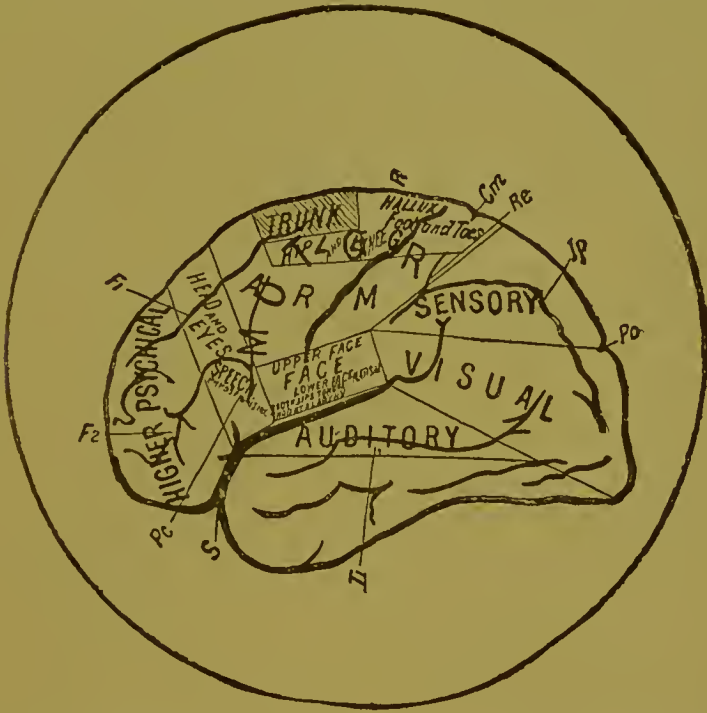


FIG. 6.—Cerebral Cortex, showing the Distribution of Function.
After Osler.

living near Boston, in America, was engaged in blasting a rock. While ramming a charge of powder a spark accidentally ignited the powder, and the crowbar, which was $3\frac{1}{2}$ feet long, went straight through his head, entering below his jaw, and coming out at the top of his skull. Wonderful to say he recovered from the injury, but from that time onwards his character was changed. He had previously been a foreman, steady and trustworthy, but afterwards he became exceedingly

idle, flighty, and eccentric so as to be quite incapable of doing his former work, and as his acquaintances expressed it, he was no longer Gage. I have already mentioned that while the brain acts on the body the body reacts on the brain. In cases of amputation of a limb, especially at an early age, the corresponding centres in the brain have been found to become more or less atrophied. Even in such a simple thing as memory we can see the co-ordination of the body with the mind. Many people are apt to forget a name when they simply hear it, but if at the same time they can see it in writing they remember it more easily, and they do this still better if they write it themselves and speak it to themselves, even if they do not say it aloud, because they then obtain the co-operation of the centres for hearing, sight, and memory, the memory of the fingers in writing, and the muscular memory of the larynx and tongue in speaking.

In order to obtain symmetrical development of body and brain by physical exercise it must be remembered that a child creeps before it walks, that the simplest movements must be learned first, and that unless these movements are done automatically they involve a certain amount of mental strain. They cannot, therefore, be regarded as a relaxation from mental work, and on the other hand mental strain will induce bodily fatigue. This has been well shown by Mosso, by means of an instrument called the ergograph, where a weight is raised at intervals by the contraction of one finger. To the string bearing the weight a lever is attached, which works on a revolving cylinder so that each contraction makes a straight stroke of a greater or less height of which indicates a more or less perfect contraction of the finger. The mental fatigue produced by giving a lecture has been thus shown to cause more rapid exhaustion of the muscles of the arm and lessen power to raise a weight. While mental fatigue thus lessens bodily power, we must be careful to remember also that unaccustomed bodily exercises produce mental fatigue. This has been well recognised by the Departmental Committee on a model course of physical exercise, where they say, at p. 12, "the learning of bodily exercises by repeated efforts demands

a concentration of attention and a mental exertion in all respects comparable to what is required in other school lessons." This report gives an exceedingly good account both of the physical and educational effect of exercise as well as a long list of examples by which the muscles of the lower nerve centres may become well developed. In reference to ordinary movements, and especially to balanced movements, the authors say that "at first each of these exercises requires for its performance in varying degree a certain concentration of mind and a certain effort of will, and it is only by repeated, and at first laborious, efforts that perfection of execution is arrived at. A certain degree of fatigue accompanies the earlier performances, and the more immature the structures put into action the more sensitive they are, and the earlier do they show fatigue. At the same time the effect of each performance is stored up as a permanent memory, the repetition becomes less fatiguing, and the result of lessons repeated week by week is that eventually the exercise becomes practically automatic. At this stage its value as an educational exercise virtually ceases, but its value as a nutritive exercise remains and is even enhanced. It follows that in a school course one and the same exercise may be used for two quite different purposes: (1) during the process of learning for its educational effect; (2) when it has been mastered for its nutritive effect, and this distinction is of cardinal importance for determining the times at which, and the manner in which, the exercise should be taken." The value of deep respiration in order to insure complete aëration of the blood is well recognised by the committee, and the free use of respiratory movements is recommended. These movements not only aërate the blood, but they assist the action of the heart so that the circulation also becomes freer. It is to be remembered, however, that the heart is an organ so profoundly sensible to the effects of emotion that in common language we translate many emotions in terms of the heart. Thus we say "his heart sank within him," that is, the beats became feeble and possibly slow, and we may even omit any mention of the fear and apprehension which produced this effect. Or we may say

“his heart beat high,” *i.e.*, that is, its beats were strong and powerful, and we may not even name the emotions of hope, joy, or pleasure which produced this action. I have already mentioned that muscles during exercise require an extra supply of blood, and if they do not receive this, increased action causes them to become smaller and weaker instead of being larger and stronger. But increased supply of blood to the muscles requires more powerful action of the heart to maintain the circulation, and thus increased muscular exercise while the heart is stimulated by pleasurable emotions tends to strengthen the body, but exercise with a heart depressed by apprehension or even by simple distaste for the movements will weaken instead of strengthen them. The same thing holds good for the nerve centres. It is, therefore, most important that physical exercise should be rendered pleasant and attractive to children, and that they should not be wearied by monotony. We see the necessity for change more especially in small children. Their movements are almost incessant, so that they weary out grown up persons who may try to imitate them. But these movements, both in children and in young animals, are not continued. They give a little jump here, a little run there, a little climb, a little rest, and so on. Everything is done for a very short time, and its movements are constantly changing. As the child or animal grows older the power of steady movement and continuous attention increases, and it is necessary to adjust the kind and amount of exercise to the age and strength of the child. Even in adult life continuous action “is, as a rule, disagreeable, and the most favourite games are those in which periods of brisk movements alternate with times of comparative rest. Amongst the best exercises for developing both the body and the higher nerve centres are games of ball. Such games have been favourites throughout the whole history of the world. We find them pictured in the tombs of ancient Egypt, we find them described in the Odyssey, and we see them to-day in every playground. They train the mind as well as the body, for they require observation in regard to the ball, judgment in regard to its speed, and rapid decision in regard to the movements necessary

to reach it, and rapidity and precision of action in these movements themselves. Their chief disadvantage is the space required for such games, but we hope that this difficulty will be met by the new legislation in regard to playgrounds. Another exercise, at present but little known in this country, but which is likely ere long to be widely practised, is the Japanese system of wrestling, *ju jitsu*. Very little room is requisite for this, and it is not only very interesting, but in it the same power of observation, judgment and prompt action is required as in games of ball, in order to employ the proper attack or defence as required by the rapidly changing movements of the adversary. Another excellent exercise is that of swimming. It seems strange that in an insular nation whose proud boast it is that it rules the seas, the art of swimming should be unknown to all except a very small minority.

Efforts are being made in some towns to encourage the practice of swimming, and large baths have been erected which are used for swimming in summer, and being covered over in winter are converted into gymnasias. It is to be wished that what is being done in some towns might be done in all. The power of floating of any individual depends greatly upon the chest capacity as compared with the development of the limbs, for the limbs are heavier than water, and the chest, with the air which it contains in the lungs, is the float. Even with a narrow contracted chest a man may swim by vigorous action, but much more exertion will be required to keep him afloat than if he had a large chest. Breathing exercises which develop the chest may, therefore, be looked upon as a useful adjunct to swimming and these exercises if practised by children will form a good preparation, not only for swimming, but for all games and efforts afterwards. By graduated exercise only can the chest be developed. The heart can also be strengthened and it is the gradual strengthening of the heart in course of training that makes it so easy for a man when thoroughly trained to do feats which would be impossible for him in his ordinary condition. But if a person attempts to do any feats either of strength or endurance which are too much for his heart, instead of strengthening it, he will strain

and weaken it. Even a short but severe exertion will cause the heart to dilate. In the young and healthy this dilatation soon passes off, but if the exercises be frequently repeated, or if it be so severe as to pass the bounds of recovery, the heart becomes permanently dilated and the person's power of work and strength is permanently diminished. But the amount of exertion which in one person would only cause pleasurable excitement is enough in another to produce cardiac strain and dilatation, and therefore medical inspection is absolutely necessary before the kind and amount of physical exercise for any child or youth is decided upon. In the University of Pennsylvania all students are obliged to take physical exercise as part of their course, but before they take it they are inspected medically. Any deficiencies they may have are ascertained, and the exercises they are required to take are of such a nature as to remedy their deficiencies and develop them symmetrically. Medical inspection may be looked upon as the foundation stone of physical exercise and we have all reason to be thankful that the present Government has rendered medical inspection in schools compulsory.

But physical education begins a long time before school life. It begins with babyhood, and the proper way to care for babies should be taught in all schools. I should not propose to establish dry classes upon hygiene which children would probably not comprehend, but I should like to see established in every school a class for the care of dolls. Every girl should have a washable, unbreakable doll which should be, for the time being, her baby. She should be taught how to wash dolly, how to feed dolly, how to treat dolly's sore throat or stomach ache, how to make clothes for dolly, how to take dolly out for exercise, how to hush dolly to sleep, how to provide dolly with fresh air and how to protect dolly from chills. In fact all the information that the girl will afterwards need for bringing up her own babies might be imparted in a concrete form in a way that they would enjoy and in a way that could be remembered in dolly's class. But what are the boys to be doing while the girls are learning how to tend dolly? Some of them may be learning gymnastics

with apparatus on the parallel bars, on the horizontal bars and on the horse, others again may play games of ball or others again may try their strength, in jumping, in obstacle races and in various games. Perhaps there is no drill which is more perfect than that which is insisted upon in cricket and boating and football, but only those who form the team enjoy the privilege of having this training. What we want is that every boy should have it, and this can hardly be done in any other way than by various forms of drill. Drill is very monotonous and may be greatly relieved by allowing the boys to learn to shoot, just as the girl's interest would be awakened by dolly. The objections to boys learning to shoot are the risk and the expense. Both of those may be reduced to a minimum by making the boys shoot with percussion caps at candles. At four or five yards the candle can be extinguished by the air issuing from a musket when the percussion cap is exploded, but the aim at the bottom of the wick must be nearly as accurate as to make a centre at a hundred yards. It might be held out as an inducement to them that the best shots would be allowed to practise with a Morris tube, and later on they might even learn the use of service rifles. The old war games such as "I spy" and "Prisoner's Base" might be adapted to modern warfare, and J. Fennimore Cooper's novels might be used to teach scouting to the bands of white men or Indians into which the boys might divide themselves. Some people might argue that such a course would tend to foster a spirit of militarism in this country. For my own part I believe that it would just be the reverse; that such training would greatly help boys to become volunteers, and that with an almost universal system of volunteering we might lessen our Army without risk, keeping a corresponding amount of tax money in our pockets, and live free from the dread of foreign invasion on the one hand, or from universal conscription on the other.

In order to ensure such a desirable end we require the co-operation of every man, woman, and child in the country, and for the purpose of obtaining this the National League of Physical Education and Improvement has been established.

The object of the League is not to displace any of the agencies at present working for the health and welfare of the people, but to make them known to one another, to ascertain how their work can best be supplemented when it is deficient, and to extend the benefits of physical training throughout the whole country. It thus hopes—

1. To save the babies.
2. To help the children.
3. To train the youths.
4. To instruct the parents.
5. To lessen the drink.

It is not a year since it was incorporated, but the good results of its action are already manifest, for it decided that the first object it should try to secure was compulsory medical inspection of schools, which it felt to be the foundation stone of physical education. It sent a deputation, on February 27 of this year, to wait on the Minister of Education. He expressed his sympathy with their requests, and now I think we may look upon medical inspection of schools as an accomplished fact.

Next we want the systematic teaching of hygiene by classes for “Dolly,” then a pure milk supply, visitation of mothers, feeding of children, and in turn everything required to make us a free, healthy, strong, wise, and moral people.

THE NATIONAL LEAGUE FOR PHYSICAL EDUCATION AND IMPROVEMENT.

ADDRESS GIVEN IN THE TOWN HALL OF SHEFFIELD
ON OCTOBER 22ND, 1906.

By Sir LAUDER BRUNTON, M.D., D.Sc., LL.D. Edin., LL.D. Abrn.,
F.R.C.P., V.P.R.S., Consulting Physician to St. Bartholomew's
Hospital.

MY LORD MAYOR, MY LORD BISHOP, LADIES AND GENTLEMEN,—The subject on which I have to speak to-night is the National League for Physical Education and Improvement. Whenever one speaks of Education one's thoughts naturally turn to teaching and teachers, and in considering what I should say to you to-night, the words of the greatest of all Teachers came into my mind, "It is more blessed to give than to receive." When speaking of the League to some persons they have said to me, "What are we going to get out of it?" and I can well imagine that you might ask me the same question. In reply to it I would say that the people of Sheffield are not to receive from the League but to give. What are they to give to it? They are to give two things—their example and their support. Their example they have already given to a certain extent, for they have been in the forefront of the movement for physical education and improvement; and the support that they should now give to the League is in order that the example they have thus shown may be made known to others, and may be followed by others throughout the length and breadth of this land. There are a great number of people who are willing to do good but they do not know how to do it. They are willing to give but they know that indiscriminate giving is often productive of more evil than good, that it tends to destroy self-respect and independence, and to foster habits of idleness and greed. So much is this the case that many people limit their giving almost

entirely to hospitals, and at first sight it would seem that no better channel for charity could be found. For what could be better, one might say, than to succour those who, through no fault of their own, are suffering from sickness, weakness, and pain, or who are in danger of death from some dire disease, a disease which may not only cut short the sufferer's life but remove the breadwinner from the family and leave behind a helpless widow and orphans. What can be better than to lessen the sickness, relieve the pain, prevent death, and restore strength? And yet, perhaps, there is something better even than this, and it is to prevent the occurrence of these calamities. But some of you may ask, How is this to be done? and I would answer—You, the people of Sheffield, have already begun to show the way, and you have taken up the problem aright. For, instead of attempting to deal with grown-up people, you have begun with the young lives, with the lives of infants, which may grow up strong men and women, fully qualified to hold their own in the battle of life, but who, if neglected, may either die off and swell that frightful rôle of infant mortality, or may have even a worse fate, and grow up sickly and feeble, unable to play their part in the struggle for existence, and go to fill the ranks of the submerged tenth.

By the careful supervision of your milk supply, which is carried out by your admirable medical officer, Dr. Scurfield, under the powers which you possess by your local Act of Parliament, you are able to provide a supply of pure milk for the infants whose mothers may be unable to suckle, and for the children in whom milk, though no longer their sole food, still forms an important part of their diet.

The rules which the Health Committee of the Sheffield Corporation and the Committee of the Sheffield and District Cowkeepers and Dairymen Association have drawn up are admirable, and form a model deserving of universal imitation. But the supply of pure milk to a town is not the only requisite for the prevention of infant mortality, for, by want of cleanliness, by carelessness, or by foolishness on the part of mothers, the child may become ill and die, however good the milk supply may be. Here again, however, you have drawn up a code of instruction

for mothers which will tend to lessen infant mortality and increase the health of the children. It is becoming generally felt that the compulsory attendance of children in schools, whilst no doubt good for their minds, is by no means an unalloyed benefit for their bodies. For in the crowded classrooms, sick and healthy become mixed up and brought into such intimate contact that epidemic diseases become more widely and rapidly spread than they might otherwise be. Moreover, the confinement for many hours a day lessens the strength of those who are already sickly and weak. In order to prevent these evils, people are now beginning to recognise that compulsory medical inspection of schools ought to be necessarily consequent upon compulsory attendance, but this the people of Sheffield have already recognised, and it has been amongst the first of the cities of this country to take up the testing of eyesight of children. This is a most important matter, because on it depends not only the power of the child to learn, but the presence or absence of those headaches which make many a child's life one of continued torture, and for the relief of this awful pain, I believe, the children of Sheffield owe a debt of gratitude not only to the Corporation but to my friend, Dr. Snell, through whose lectures to the teachers it originated years ago.

Compulsory attendance for so many hours a day in a room where a child must sit, often in a constrained position, instead of playing about freely in the open air, is injurious to the child's body and prevents the free development of the muscles of the heart and of the lungs which it might get by playing in the open air, even if it should be in the slums of a great city. To counteract this injurious effect to some extent the Board of Education has decided that a certain amount of physical training is necessary, and I am delighted to see that Sheffield not only does this, but has made provision for education in swimming. Swimming is one of the exercises that not only tends to develop every muscle in the body but to increase the power of the heart and lungs, but it gives a certain amount of moral training. It increases self-reliance, and how often do we see also that swimmers distinguish themselves by the generous way in which they throw aside all thought of self and risk their

own lives to save those of their fellows. Swimming is an exercise not only useful for children at school but for older lads and young men, and enables them to spend not only with pleasure, but with much advantage, time that might otherwise have been heavy on their hands, and which they might otherwise have been induced to misspend in the streets or public houses. But swimming cannot occupy the whole of a man's time, he must have other occupations as well, and gymnasia and volunteering may combine with swimming to fill up a young man's leisure to the best advantage.

I have enumerated some of the things in which Sheffield has already shown an example to this country, but I think it very probable that many of my hearers will say that I show a remarkable amount of ignorance in regard to what Sheffield is doing, and that Sheffield is really doing ten times more than what I have mentioned. But if this be the case with me, what must it be with others? I have made some inquiries as to what is being done in Sheffield, but what will be the condition of those who have made no such inquiries? The great majority of people in this country are absolutely ignorant as to what Sheffield has done or is doing in order to prevent infant mortality and raise up a strong and healthy race. Now, although we are told that we should not let our right hand know what our left hand doeth, we are also told equally emphatically that we ought to let our light shine before men so that they may see our good works. Now, this is what Sheffield should do by supporting the League. It should let other people know the example that Sheffield is setting and get them to follow it. There are any number of good men, good women, and good societies all working for the benefit of the people. They are working in Birmingham, Liverpool, London, Manchester, and all over the country, but they do not know what the others are doing, and from want of this knowledge they are wasting time, they are wasting energy, and in the meantime infants are dying and weaklings are growing up. One of the great objects of the League is to make all these people, all these societies, known to one another. The League does not intend to interfere with the action of any

one of them. Its object is that of getting them mutually to help and to co-operate. The old fable of the bundle of sticks illustrates what I wish to say so clearly that, although I have already made use of the comparison when speaking elsewhere, I should like to use it again. You all remember the story of the old man who, on his deathbed, handed to his family a bundle of sticks and asked each one in turn to break it. They found it impossible. The old man then asked them to break the sticks singly. This they did with ease. "Now," said the old man, "you are like the bundle of sticks, so long as you are united, no one can break you, but singly you will be easily destroyed." The League is not an additional stick to the bundle, but it is the band which will tie them together.

Now, what are the objects which the League has before it?

The objects of the League are numerous, but for the sake of convenience they may be shortly summed up on the fingers of one hand thus—

- (1) To save the babies.
- (2) „ help the children.
- (3) „ train the youths.
- (4) „ instruct the parents.
- (5) „ lessen the drink.

The second question is, What does the League intend to do in order to attain these objects?

Before answering this question positively, it may be well to state what the League does **not** intend to do.

It does **not** intend to interfere in any way with any society which is already working for these objects.

On the contrary, it hopes to help each and all of them in the work they are already carrying on by making them known to each other, so that they can render mutual assistance and extend the good work done by those societies already in existence to other places where it is wanting.

Having given this explanation of what the League **does not** intend to do, we may now consider what it **does** intend to do.

- (1) To save the babies. The mortality amongst children

under the age of 5 is enormous, and under the age of 1 it is simply appalling. This awful mortality is due—

- (1) To the weakness of mothers.
- (2) „ ignorance of mothers.
- (3) „ carelessness of mothers.
- (4) „ imperfect milk supply.

(1) The weakness of mothers prevents them from suckling their offspring. The ignorance or carelessness of mothers makes them feed their infants on food which is unsuitable for them, and in consequence they either die, or their health is impaired and their strength enfeebled.

But even when mothers are neither ignorant nor careless they are often unable, especially in towns, to obtain pure milk, however desirous they may be of doing so.

In order to lessen the weakness of mothers, and give them a chance of suckling their children, the League desires that every woman about to become a mother should become known to it, in order that measures may be taken to give her rest—or at any rate only easy work, without strain—for at least a month before and a month after her confinement. Information of the expected confinement may be obtained either by the woman herself giving notice at the nearest office of the League, or by the medical man or midwife to whom she applies for attendance doing so. At first it would be most likely the latter; but as the League and its objects become more widely known, the woman herself would probably give the requisite information. The required rest before and after confinement might be obtained in many cases by the aid of district nurses or voluntary helpers, who would do the heavier work for the mother. In some cases, however, where the earnings of the mother form an essential part of the income of the household, it may be necessary to subsidise her. The funds for this purpose would require at first to be obtained from voluntary contributions, but later on, when the necessity of some provision of this sort becomes known to the working classes themselves, the necessary money might be subscribed by themselves, in the same way as strike funds are maintained at present.

As soon as the expected confinement is known to the League a lady visitor in the district will be notified, and she will visit the prospective mother and give her the information required about the mother's own health, the care she should take, the risks she should avoid, and the preparation in the way of baby clothes, &c., which she ought to make, helping her if necessary, or arranging with other women of the mother's own class in life to help.

As soon as the baby is born, notice should again be given at the nearest office of the League, and again a visitor would go to the mother and give such advice and assistance as might be needed.

At Huddersfield the Mayor, Mr. Broadbent, has initiated a remarkably ingenious, generous, and successful scheme for obtaining early information of a birth by offering a reward of one shilling to the person who brings the first news of it to him. He has also put a premium on careful nourishment by offering a gift of one sovereign to each baby on its attaining the age of one year. It is to be hoped that similar generosity may be found in other large towns, and, at any rate, that immediate registration of every birth may be obtained.

It is obvious that the lady visitors who are to instruct the mothers must themselves be well instructed, and provision must be made for this either by the agency of the National Health Society, or by others.

In order to secure pure milk it is necessary that the suggestions which have been conjointly drawn up by the Health Committee of the Sheffield Corporation and the Committee of the Sheffield District Cowkeepers and Dairymen Association should no longer be simply suggestions with which every cowkeeper and milk seller ought to comply, but should be enforced as laws with which they must comply, and that not in Sheffield alone, or in Manchester alone, or in Liverpool alone, but throughout the whole country. By the example which Sheffield has set in this matter the whole country is benefited, and by aiding the League its example will be more widely known. But may not Sheffield also benefit by the aid of the League? I believe that the excellent regulations

of which I have spoken cannot be enforced over the whole area from which Sheffield draws its supplies of milk, and therefore many of the inhabitants run the risk of disease from infection from which they would be exempt if these regulations were passed into law, binding upon those concerned with the supply of milk throughout the country at large. This is a question which naturally is of vital importance, and it has been occupying the attention of the League for some time. The League has now before it a series of proposals drawn up by your able officer of health, Dr. Scurfield, with the co-operation of Dr. Hope of Liverpool, Dr. Niven of Manchester, and others, that a Bill be drawn up for the purpose of extending the local Acts which confer special privileges upon Sheffield, Manchester, and Liverpool to the whole country, and to insert other provisions which shall secure the purity of milk everywhere. Here we see where the League comes in. Sheffield, Manchester, Liverpool by themselves might be unable to obtain the powers requisite to control the whole district from which the milk supply of each is drawn, but if they are united by the bond of the League with each other and with every town and rural district in the country, legislature may be effected, and, by combined action, benefits obtained in which every town will also participate.

Another object of the League is to secure universal medical inspection and examination of school children. Here, again, as I have said, Sheffield has shown the way, and the League brought the subject before Mr. Birrell at a deputation on February 27th, which was introduced by Mr. Compton Rickett and Sir Henry Craik. Mr. Birrell intimated his sympathy with the objects of the Deputation, and the subject having been again brought before him by the Manchester and Salford League and by the British Medical Association, he practically decided to adopt it in his Bill. What the future of this Bill will be no one can at present tell, but even supposing it were wrecked, the medical inspection of schools only requires combined action in order to secure its enactment by the Legislature before the end of the year, and this combined action we trust may be brought about by means of the National League. The

question of the proper feeding of children in schools is also one that should engage the early attention of the League, and it will use its efforts to secure that children shall be properly fed, while at the same time the burden of feeding them should be thrown upon the parents and not upon the ratepayers. The extension of cookery schools and classes of cookery for mothers will form another branch of activity of the League. Other objects of the League's activity will be the provision of playgrounds, general training in physical exercise, the instruction of parents, and the abolition of slums. Several of these questions I have already entered upon at considerable length in an Address which I had the honour to give in Sheffield about the beginning of this year, so that I will not detain you further now, but will again insist "that it is more blessed to give than to receive," and that Sheffield should not only set an example to be followed by the whole world, but give its aid in enabling others to follow its example, and for this reason I trust that a National Branch of the League will be established in Sheffield.

PHYSICAL EDUCATION AND TRAINING IN RELATION TO NATIONAL DEFENCE.

[PROCEEDINGS OF THE NATIONAL DEFENCE ASSOCIATION.]

By Sir LAUDER BRUNTON, Bt., M.D., F.R.S.

Paper read at the evening Meeting of the National Defence Association, at the Piccadilly Hotel, November 25, 1908.

Sir GEORGE TAUBMAN-GOLDIE in the Chair.

(Reprinted from *National Defence*, March, 1909.)

It is eight hundred years since this island was last invaded. May it be eight hundred years before it is invaded again. In the only other Empire that could compare with the British there were free men, but there were a great many slaves; whereas in the British Empire it is our proud boast that there shall be no slavery where the British Flag flies. We have been accused of being greedy; we have been accused of being selfish, perfidious, stupid; well, these accusations may not be entirely baseless, yet I believe that the great characteristic of Britons is fairness. We want to be fair always. We sometimes do things that may be unfair, but I believe it is through ignorance, not through wilfulness; and that the great motto that we put before us is, "Let every man have a fair chance."

Now I believe we all wish that; but this motto is not carried into practice as it ought to be in this country. A great many men and women are born who have not had a fair chance from birth onward. It is not that they have been born poor, because poverty may be a stimulus to exertion; but it is that they have been born feeble in body, weak in mind, unfit for work, even if they had no disease either mental or bodily. It is this great body of unfit who go to swell the ranks of the unemployed or to form the criminal classes.

Now it is our duty as citizens to see that all these people get a fair chance. I have heard it said that if this island were

invaded, as Lord Roberts showed us only too clearly two days ago that it might be, the whole population would rise as one man to resist the invader, and drive him from our shores. People who speak in this way do not know modern warfare. An undisciplined mob, however strong they may be individually, if they have not training, could not stand up for a moment against a disciplined army. That is, even if they were well armed and if they were physically fit. But unfortunately they are not fit; and I think we owe a great debt of gratitude to General Sir Frederiek Maurice for having shown us the extent of their unfitness. In the Boer War, when a number of recruits came forward to enter His Majesty's army, one-third of them were rejected at once because they were physically unfit; and within two years so many more were found to be unfit that it brought up the proportion very nearly to two unfit for every five who offered to serve. Well, if they were not fit for soldiers, when they would be well fed, well housed, and well looked after, what were they fit for? They had not trades to which they might turn for a livelihood; and the unskilled labour which will dispense with brains requires a strong physique, which these men did not possess. All that they could do was to fall back into the ranks of the unemployed, to look for subsistence to the poor rates, or else to join the criminal classes.

Now what we wish to do is to see that every man has a fair chance—in other words, that he is healthy—and before we can have healthy men, we must have healthy lads, healthy children, and healthy babies. Beginning with the babies, we must have mothers who are instructed how to take care of them. They must be able to obtain pure milk, and the children at school must be fed—if they cannot be fed otherwise—by gratuitous assistance. Not that we wish to interfere with the responsibilities of parents, but we must take care that the children are strongly and well brought up, and of good physique. I am glad to say that the National League for Physical Education and Improvement have already taken the matter up; they are dealing, as far as they can, with every department of physical unfitness. The League has joined with other bodies

in representing to the Government the absolute necessity for the medical inspection of schools, and we have at last obtained it. This medical inspection, if properly carried out, will detect the seeds of weakness and disease in time, before they ripen, and will enable us out of the weak and delicate children to rear up strong and healthy men and women. But medical inspection will do more. It is the indispensable preliminary to physical training, because without medical inspection physical training may do a great deal of harm instead of good. The exercises which are sufficient for one may be too much for another, and those which will best develop the muscular system, the heart and the lungs, in one child, may strain the heart in another and ruin a life. But when safeguarded by medical inspection, physical training is one of the best and most powerful means at our disposal for bringing up healthy children—children who will ultimately maintain the credit of their country, in peace or war, at home or abroad.

Now our system of games at public schools is the admiration, I might say almost the envy, of every Continental nation. Games are not merely exercise which trains our boys to be fit in body; they train them also to be fit in mind. There is no better discipline than that to be obtained by membership of a football team or a cricket club, because in the early days the boys learn how to obey, and later on they learn how to command; and, moreover, they learn how to select their own leaders and follow them. Our public-school boys very often leave school not overburdened perhaps with book learning, but with good physiques and well-balanced minds which enable them to hold their own in every part of the world to which they go.

What we want is that the children of the poor shall have the same advantages as the children of the rich. We want them to have a fair chance.

How is this to be obtained? The country has already decided that the children of the poor shall have a fair chance as far as the three R's are concerned, and they are taught their three R's all right. But what is the consequence of teaching them in this way, and making no provision for their physical education? I speak as one unlearned, but I take an extract

from a paper called 'Engineering,' and I read that the opinion of one man who ought to know about it is that the lads who have been taught the three R's, pass the examinations, get into engineering, and then "they cannot stand up to the work day after day for lack of bodily fitness and strength. They have been educated, but they have not been fed. They have not had sufficient healthy outdoor exercise. Their brains have been worked at the expense of their bodies, and the body from the first, on account of the poorness of the parents, has never been robust. The physique is lacking. On the other hand, the mental training and success in competition give the lads an unwarranted sense of their own importance." If this is the case in engineering, what is the case in other trades? There are many exceptions, but as a rule success comes to the man who is able to work a little longer or a little harder than his neighbours.

Now, in order to see that the boys of the poor have the same physical advantages as the boys of the rich, we must give them physical training. Of what kind is this to be? The Board of Education has issued a most excellent memorandum and manual, and the physical training recommended in them will, I think, give to those boys not only strength in their physique, but the power of quick observation, of close attention, of ready obedience, and of co-ordinated action which will be most valuable to them in their future life.

I have already referred to the Roman Empire, and it seems to me that the success of that Empire was due to the amount of discipline that its sons had; as the Roman centurion in the Gospel put it: "I say to this man, Go, and he goeth; and to another, Come, and he cometh; and to my servant, Do this, and he doeth it." It was this discipline that enabled the Romans to overcome the Germans and the Gauls—who were stronger individually and probably more athletic than the Roman soldiers—and enabled them to crush the armies of the East, which had an older civilisation. It is the lack of this training amongst the masses in this country that produces so much irregular and imperfect work, and makes a number of men, instead of sticking to their work, to their profession, or to

their employment, fall into the ranks of the unemployed; and the training now to be given in our elementary schools will be of the utmost value in preventing all the misery that will be consequent upon such unemployment.

But this is not all. Drill and gymnastics will go a certain way, but we want something more. We must have playgrounds; because it is not only muscles that we want; we must have heart and lungs; and the value of heart and lungs is well expressed in the popular words, "He is a good plucked 'un," which recognises that when a man has a good heart and lungs he is likely to do well, and that a "faint heart" is something more than a mere general expression. A weak heart does have a great deal to do with want of success in life. Playgrounds offer as great an aid in physical training as the gymnasium. In Switzerland they are looked upon as of equal value with the gymnasia, or perhaps of even more value; and there they have games masters, who watch the games, and take care that those very boys who require physical training most—viz., the weak ones—are not pushed aside by the stronger, but that they have their fair share in the games. We do not want the muscles strained to too great an extent. What we want is an all-round man, a man who has his muscles in good co-ordination, who has a good heart and good lungs, and who has a good training in the sharp obedience to command, or, in other words, in discipline. We must recognise that in the playground and in the gymnasium we have not only to give the physique, we have to train it in obedience to command; and at first this training is as distinctly irksome as is training the hand in learning to write, and although in learning to write the process is so disagreeable, yet afterwards, when a man has fully mastered the art, it becomes to him pleasure instead of pain, so that, although the exercises which are at first disagreeable, and require a considerable exertion of the attention, are really hard work, after a while they become easy and a source of pleasure.

Physical training should not cease with schooling. There is an interval between school life and manhood which is of the utmost importance; because it is just then that the boy's life is directed for good or evil. The apprenticeship system used to

get over this difficulty; but apprenticeship has now fallen into disuse, and boys, just between the age of leaving school and the age of manhood, may very often fall away and get into bad ways. But there is a great objection on the part of very well-meaning people to anything that savours of what they call "militarism," and they hate the idea of cadet corps and such like. It is for that reason that I wish to read to you what is not simply my opinion—because any opinion that I give to you may be thrown aside as of no value—but I wish to read to you the opinion expressed by the Inter-departmental Committee on Physical Deterioration, as showing the value of these clubs and cadet corps. This is recommendation No. 46, in regard to clubs and cadet corps :

"Having regard to the enormous value to the physique of growing lads of such institutions, and to the possible saving of expenditure in other directions resulting therefrom, the Committee are of opinion that some grant should be made from the National Exchequer in aid of all clubs and cadet corps, in which physical or quasi-military training on an approved scheme is conducted, subject to public inspection, and lads should be made to attend evening continuation classes in which drill and physical exercises should take a prominent place. Exemption from the obligation might be granted to all enrolled and efficient members of such organisations as submitted to inspection, etc."

This is, I think, a most important recommendation, because, if carried out thoroughly, it would tend to prevent a number of young fellows becoming hooligans; and I am sure even those who object to militarism must say that it is far better for a young fellow to become a Volunteer than to become a hooligan.

Over and above the direct use of cadet corps and such like institutions to the boys themselves there is the reflex effect upon their homes. Mr. Hanson tells me that one of his boys who went to Bisley and gained a prize simply revolutionised his home by so doing. The father and mother, who had before been drunken, unthrifty, and dirty, became clean, thrifty, and sober, because they wished to live up to the reputation of their

boy. Now it is very much better for the country to pay the subsidies demanded by this recommendation of the Physical Deterioration Committee than it is to have old-age pensions and the like. Instead of spending money upon the unemployed, and upon old-age pensions, let us see to it that the children are so trained that they may earn pensions for themselves, as well as a good wage while they are active. At the same time, if we give them good physiques, we not only enable them to earn these pensions and good wages, but we lessen the tendency to disease and to drink; because drinking very often comes on because either the person is weak physically, and wants to pull himself together, or he is depressed in his mind by that very want of success that is apt to come on from the weak physique. So that, with physical training, we shall increase the earning power of the country and lessen our expenditure, which is greatly to be desired in these days of very heavy taxes.

How is all this to be obtained? The country would require probably to give every boy, perhaps 1*l.* a year—that is to say, about as much as a week's wage to one of the unemployed. There are, I believe, nearly 200,000 boys who might want this in a year, and there are about 200,000, I take it, in the ranks of the unemployed at present; so that this would mean an expenditure of the same amount upon training the boys for a year as is now spent upon the unemployed in a single week, not to reckon at all the old-age pensions, which will come to a great deal more. The Inter-departmental Committee lay it down that the whole of this great work must be effected by co-ordinate action, and they desire greatly that we should find municipal organisations working together with some great central body—they suggest the Twentieth Century League—or another. Now the Twentieth Century League has been amalgamated with the National League for Physical Education, so what this Committee requires is to have the National League for Physical Education working along with municipal bodies. We trust that a good example may be set before long in London by the present Lord Mayor; but perhaps some other speaker may enlarge more upon this subject.

One is glad to see that the country is awakening slightly; but

the amount of what is termed in this Committee's Report "complaisant optimism" among the higher classes, and apathy among the lower classes, is simply appalling. It reminds one really of the old days before the Flood, when we learn that the population, careless of warnings that they had from the Patriarch, married and were given in marriage; they bought, they sold, they planted, they builded till the day that Noah entered the Ark, and then the Flood came and destroyed them all. We shall hope that the flood of invasion will not come upon us before we are prepared; but we are bound, every one of us, to bestir ourselves to our very utmost, lest the day of salvation pass.

BOY SCOUTS.

By SIR T. LAUDER BRUNTON, Bt., M.D., LL.D., F.R.C.P., F.R.S.

(Reprinted from *The Daily Telegraph*, June 4, 1910.)

EDUCATION in order to be complete should not only be mental and physical, but also moral. For a good many years back the nation has recognised the mental education of children as necessary in order to fit them for their duties as citizens. The second International Congress for School Hygiene, held in London in 1907, gave an impetus to physical training in schools, and an excellent system of such training has now been introduced by the Board of Education into all primary and secondary schools.

But there is no provision for moral training, and a thorough mental and physical training renders a boy, who from lack of moral training grows up a hooligan, only more dangerous to society than he would be without it. A system of thorough religious training might do much to complete the boy's education, so that he might grow up a worthy member of society ; but at present differences of opinion regarding the proper kind of religious teaching are so great that at present we have no complete system, and it may be a good while before we get one. And even if we had religious teaching, it would not be sufficient, for it is not teaching but training that boys need. It is all very well to tell them they ought to be brave, strong, observant, thoughtful, self-reliant, ready to obey the call of duty, virtuous, and unselfish, like the young hero who so recently sacrificed his own life to save that of another. But merely preaching these virtues to boys is of little use.

We need a system which makes the boys practise them, and this is what the Boy Scout movement supplies. It leads them to practise all the virtues, and saves them from the vices ; and it seems to me that everyone who has at heart the morality and virtue of the rising generation must wish success

to Sir Robert Baden-Powell and the scheme which he has originated, and must desire to help it to the best of his ability. Now one of the difficulties in the way of its rapid extension will necessarily be the difficulty of obtaining a sufficient number of scout masters. Much of the training requisite to qualify men or youths for such a position must be given in the open air, but a good deal of preliminary work could be best done in some central institute, where first-rate teachers could give the preliminary instruction to scout masters, and whence instructions could be furnished to various parts of the country to finish the instruction of scout masters in field work. Such an institute would practically be a Board of Moral Education, and the ideal to be aimed at would be the association of a branch of Boy Scouts with every school throughout the country.

So much do I feel the necessity of such a Central Boy Scouts Institute that, in addition to fifteen guineas, my subscription for three years to the general fund, I enclose fifty guineas, which may form a nucleus towards its endowment. Such an institute would form a visible memorial to our late beloved King, and might bear his name.

NATIONAL DEFENCE AND PHYSICAL EDUCATION.

(Reprinted from *The Times*, March 20, 1913.)

TO THE EDITOR OF *The Times*.

SIR,—Whatever system of national defence may be ultimately decided upon, it is evident that before we can have efficient soldiers we must have strong and healthy men. The compulsory physical training proposed by Lord Herschell, on behalf of the Secretary for War, would be most useful, for by it the bodies as well as the minds of the youth of this country would be developed at a very much earlier age than that at which they would be ripe for conscription. This is a proposal to carry into effect the advice given by the Physical Deterioration Committee in paragraph 390 of the report presented to both Houses in 1904.

But if physical training is to be limited to continuation schools it will lose half its value, for it ought to be begun much earlier. As the German Emperor said, with his usual clearness and force, “Wir müssen kräftige Kinder haben.” In its report this committee gave much useful advice in regard to the health of infants and children which might well be carried out by the State, but is left at present in a great measure to voluntary organisations. Two of these mentioned by the committee are now fused into one, the Twentieth Century League having become amalgamated with the National League for Physical Education. Two great objects which this league proposed to obtain were, first, compulsory physical training, and, second, compulsory medical inspection in schools, which they regarded as a necessary preliminary in order to prevent the physical exercises doing harm instead of good. Partly at least, as I think, through the insistence of the league, both of these are now legal, but the physical training is short of what it ought to be because the time devoted to it is too short in

comparison with book work, and because there is insufficient provision for training the teachers. The league has had a very strong committee considering the question. In 1909 it reported, amongst other things, that a central institute for physical training was highly desirable. This institute should be similar to the central institute in Stockholm, and should grant certificates of efficiency to teachers. To it should be affiliated all existing schools of physical training which on inspection are approved of, and other schools should be instituted where necessary. The efforts of the league to find the money requisite to found such an institute have unfortunately been hitherto unavailing. The committee also recommended the extension of physical education to secondary schools, and the institution outside the school curriculum of scouting, rifle clubs, etc.

About the same time the Boy Scouts organisation was started by Sir Robert Baden-Powell, and it has since grown by leaps and bounds. It supplies in an attractive form the physical and mental training which the ordinary school curriculum does not give, and, what is perhaps most valuable of all, it develops a "scout conscience," which enjoins every scout to do at least one good action every day, and forbids him to do anything mean or unworthy of a scout. But the organisation also lacks financial support, and while scouts are abundant the supply of scoutmasters is insufficient. Here, too, an institute for training scoutmasters would be most helpful, for although much of their training must necessarily be in field work, yet a good deal of preliminary instruction might be given in an institute. Both the National League and the Boy Scouts are concerned only with the physical, mental, and moral development of the boys, and give no military training whatever. There are, however various brigades for military training supported by voluntary subscription, and more especially I may mention the Imperial Cadet Association. In a letter to *The Times* of January 8, 1913, with which I thoroughly agree, Lieutenant-Colonel Hanson urged that continuation schooling continued with cadet corps should be compulsory. The Physical Deterioration Committee also recognised "the enormous value to the

physique of growing lads of these institutions"—viz., clubs and cadet corps—and recommended that they should be aided by some grant from the National Exchequer. In Switzerland, where more money is spent per head upon education and less upon military matters than in any other country in Europe, boys may take all their ordinary drill and education in rifle shooting while at school, and are then called upon only to serve in combined movements of troops. The time that is taken from the youth's working life is thus very small, but if the boy does not learn his drill and rifle shooting while at school he has to give up more time afterwards.

If all parties will sink political differences and agree upon a complete scheme of physical education embracing exercise and drill in schools, scouting, and, finally, training in the use of the rifle and combined military movements, they will not only secure national defence but greatly improve the physique of the nation.

I am, Sir, your obedient servant,

LAUDER BRUNTON.

10, Stratford Place, Cavendish Square.

THE BOY SCOUTS MOVEMENT.

To the Editor of THE LANCET.

SIR,—As a member of council of the Boy Scouts I have been requested by the Chief Scout, Sir Robert Baden-Powell, to write to you regarding the appeal he is now making for £250,000 for a permanent endowment fund, the income from which will be spent for the Boy Scouts movement. Companies of Boy Scouts are now being formed all over the world, and everywhere in this country they are to be seen on Saturday afternoons. No one can fail to be struck by their alert, cheery looks as they pass along the roads, by their civility when addressed, or by their willingness to help to the utmost of their power whenever they are asked.

But it is probable that many of those who are familiar with their appearance have never thought that the Boy Scouts is probably the greatest educational movement of modern times. It is not one-sided, it does not cram the boys with book learning, but it draws out the best that is in them. It trains them in body, in mind, and in morals. It trains their bodies by well-directed exercise in the open air. It trains their minds to observe exactly, to think clearly, to decide quickly, and to act promptly, whether in returning a lost child to its parents or stopping a runaway horse. Last, but not least, it trains their morals by establishing a "scout conscience." Everyone knows how much more sensitive a "schoolboy conscience" is to a breach of the traditions of his school than to a breach of the masters' rules, and in the lives of many, perhaps of most people, the

opinion of Mrs. Grundy is more potent than the Ten Commandments in deterring them from doing evil and inducing them to do well. The "scout conscience" is as powerful as the schoolboys', and its great virtue is its unselfishness. The scout must not do anything unworthy of a scout however pleasant it might be, he must be ready to obey proper authority, he must think of others as well as of himself, he must be ready to help when needed, and he must do at least one good deed without hope of reward every day of his life. It is easy to see what an influence such a training as this will have on the lives of the coming generation. To-day the bane of the world is selfishness. In the family it leads to discord and causes the children to neglect the wishes and be indifferent to the comfort or necessities of their parents. It causes the parents to neglect their children and leave them to chance or to the State. It leads the employers of labour to be careless of the needs of their employees. It leads the workmen to shut their eyes to everything but their own desires, to disregard the engagements entered into by their own representatives, and to arrange strikes which will bring much suffering to the wives and families of their fellow workmen as well as a maximum of discomfort or even danger to the whole community. It is most disheartening when one asks help for a philanthropic object to be met by the question, "What am I to get out of it?" and to find that when the questioner sees no prospect of personal advantage he promptly refuses his aid.

To this condition of selfishness there are numerous and noble exceptions. Not the least of these is afforded by the medical profession, whose members, brought as they are by their work into daily contact with sickness, sorrow, and death, give freely of their time, skill, strength, and health, and even sacrifice their lives to an extent which only they

themselves know. Often they refuse to take the money which their services have well deserved, and out of their hard-earned savings they give for philanthropic objects more than they can well afford. How very different the spirit is, which actuates many who seek their aid, they have, alas! too many opportunities of learning. The same unselfish spirit that animates the medical profession is what the "scout conscience" is trying to instil into the boys of the present time, who will be the men of the future. For this reason the Boy Scouts movement deserves well of the medical profession, but not for this reason only. Although every advance in hygiene tends to lessen sickness and thus diminishes the fees which attendance on the sick would bring to them, medical men have consistently disregarded their own interests and have welcomed and assisted every movement that promised to lessen disease and increase the health and strength of the people. The Boy Scouts movement is doing much for the physique of the rising generation, but there is much more to be done. As the Chief Scout says, in the slums of our great industrial centres thousands of the poor-class boys are never given a chance to start fair in the race for life, though they might become good citizens and valuable assets to the nation were a little trouble taken to help them. This is one of the things the Boy Scouts movement proposes to do as soon as a sufficient income can be assured to provide the necessary organising staff for this purpose as well as for the training of scoutmasters throughout the country. The Chief Scout is making an urgent appeal for £250,000, as I have already mentioned. Boys there are in plenty who are willing to give their time and energies to the work of scouts, but they need training, and there are not enough scoutmasters, and, willing as they are to do their very

best, some of them are insufficiently trained themselves.

This appeal of the Chief Scout is certain to find a welcome amongst medical men. As a rule they are not rich themselves, but I feel sure they will give according to their means, and amongst their patients and friends they may find many who are both able and willing to give provided they are assured that the object is good. In his appeal the Chief Scout says that one friend of the movement writes: "I will give £500 if 100 others will do the same." Another writes: "I will give £100 if 1000 others will do likewise." For my own part I will make one of this 1000, and I trust that every medical man throughout the country will not only contribute as much as he can himself but will induce others to do likewise for the sake of the coming generation and the country.

I am, Sir, yours faithfully,

LAUDER BRUNTON.

Stratford-place, May 9th, 1914.

SHOULD MEN WORK SIX DAYS OR SEVEN ?

(Reprinted from *The Lancet*, April 3rd, 1915.)

TO THE EDITOR OF *The Lancet*.

SIR,—At the present time when there is urgent necessity that munitions of war should be turned out with the greatest possible rapidity, it is very important that men engaged in their manufacture should be able to do the maximum amount of work with the minimum of harm to themselves. In relation to this question I think that an experiment made many years ago by my friend, the late Lindsay Russell, Surveyor General of Canada, is of great interest. Along with Professor Pearce, who represented the United States, he surveyed the boundary line between the United States and Canada so exactly that I believe its accuracy has never been called in question. On this expedition, or some of his other surveying journeys, he and his men had to pass over great spaces where there was neither game nor fishing, and were therefore obliged to take their provisions with them. The forts at which these could be replenished were generally placed about 40 days' march from each other, and as the surveying party, on account of the weight, only took sufficient provisions for the distance and no more, they were obliged to cover it in a given time for fear of starvation. On some occasions he had men and horses and on others men and dog trains. Necessity obliged him to work his men and animals as hard as they could for seven days a week and six weeks at a time. Under this strain the horses usually gave out about the twentieth day, but the men and dogs seemed to be uninjured and only to grow harder and harder. On other occasions, however, when there was no necessity for such extreme exertion he worked his men only six days a week and allowed them to rest completely on the seventh. As he was engaged in surveying operations he knew exactly how many miles his party had travelled in a day ; he knew how many pounds weight each man carried, and was

thus able to calculate exactly in foot-pounds the amount of every man's daily work. On reckoning it up he found, to his astonishment, that the number of foot-pounds done by the men working six days a week was almost the same as when they worked seven days a week. Although the men were able to work seven days a week to their utmost capacity all day in the open air, and sleeping in the open air all night for seven days a week without harm, it is unlikely that men working under much less favourable conditions in a factory will stand continuous work in the same way as the surveying party. In all probability if the men work at their full capacity for six days it will be better both for them and the work they turn out that they should rest on the seventh.

I am, Sir, yours faithfully,

T. LAUDER BRUNTON.

De Walden Court, W.,

March 29th, 1915.





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